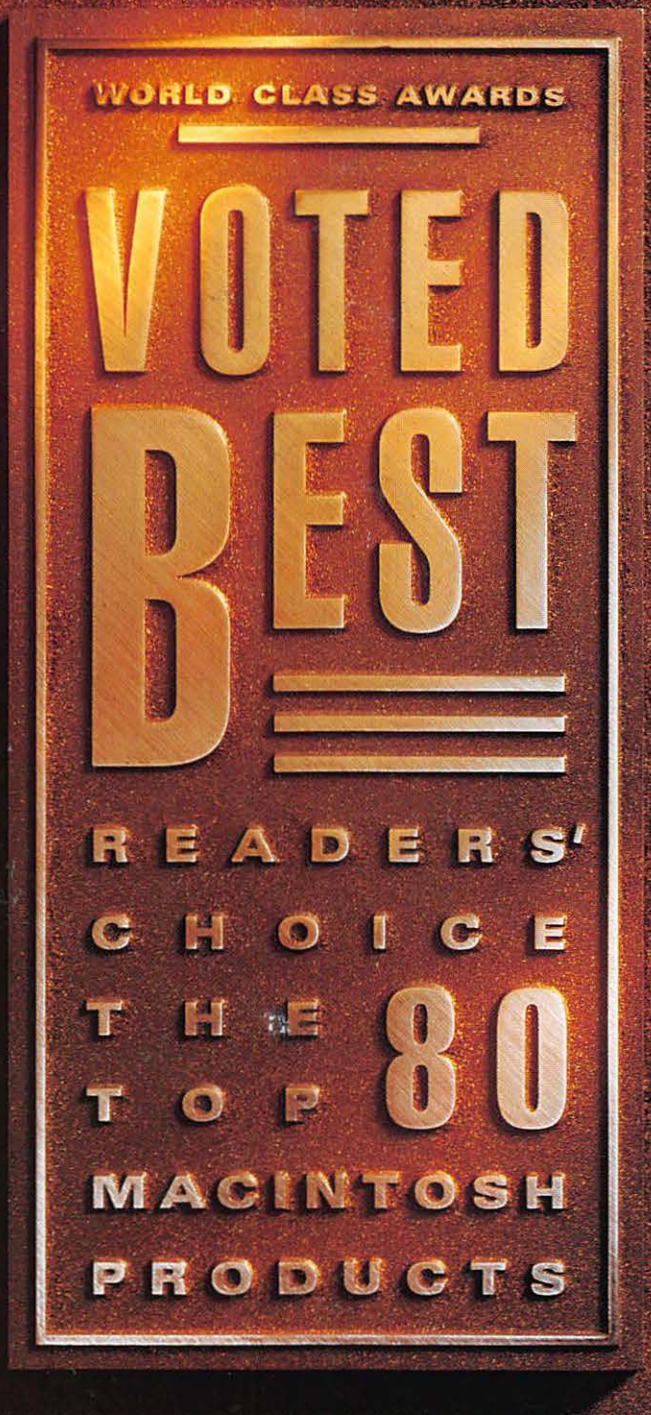
NEW! QUICKTIME: PAGE 80 • FAX MODEMS • TYPE • MAC IN SCIENCE

MACWORLD

The Macintosh® Magazine

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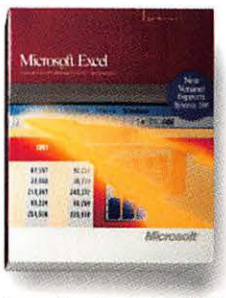
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New Microsoft Excel of an exhaustive cor



Betsy Mill put it all in perspective when she wrote to us, "I love [Microsoft] Excel as much as my microwave oven but no love is perfect."

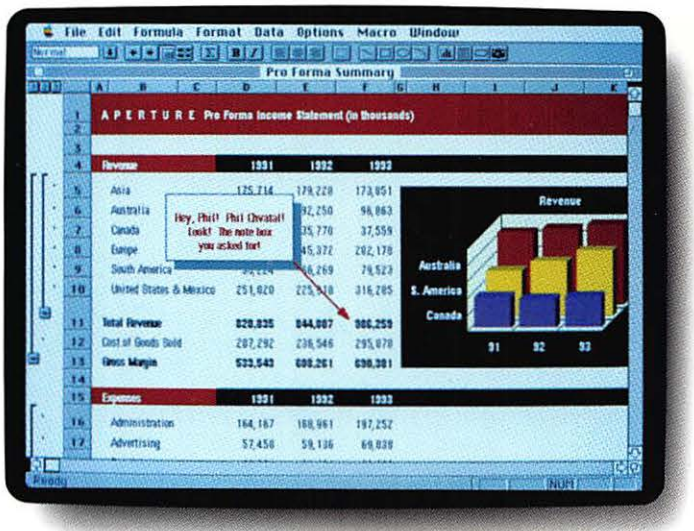
Well, Betsy, get a load of this. We think new Microsoft® Excel version 3.0 is the closest thing to perfection ever seen in a spreadsheet for the Mac.® For one good reason.

Power made easy.

The new Toolbar,™ for instance, reduces common, time-consuming tasks down to one step.

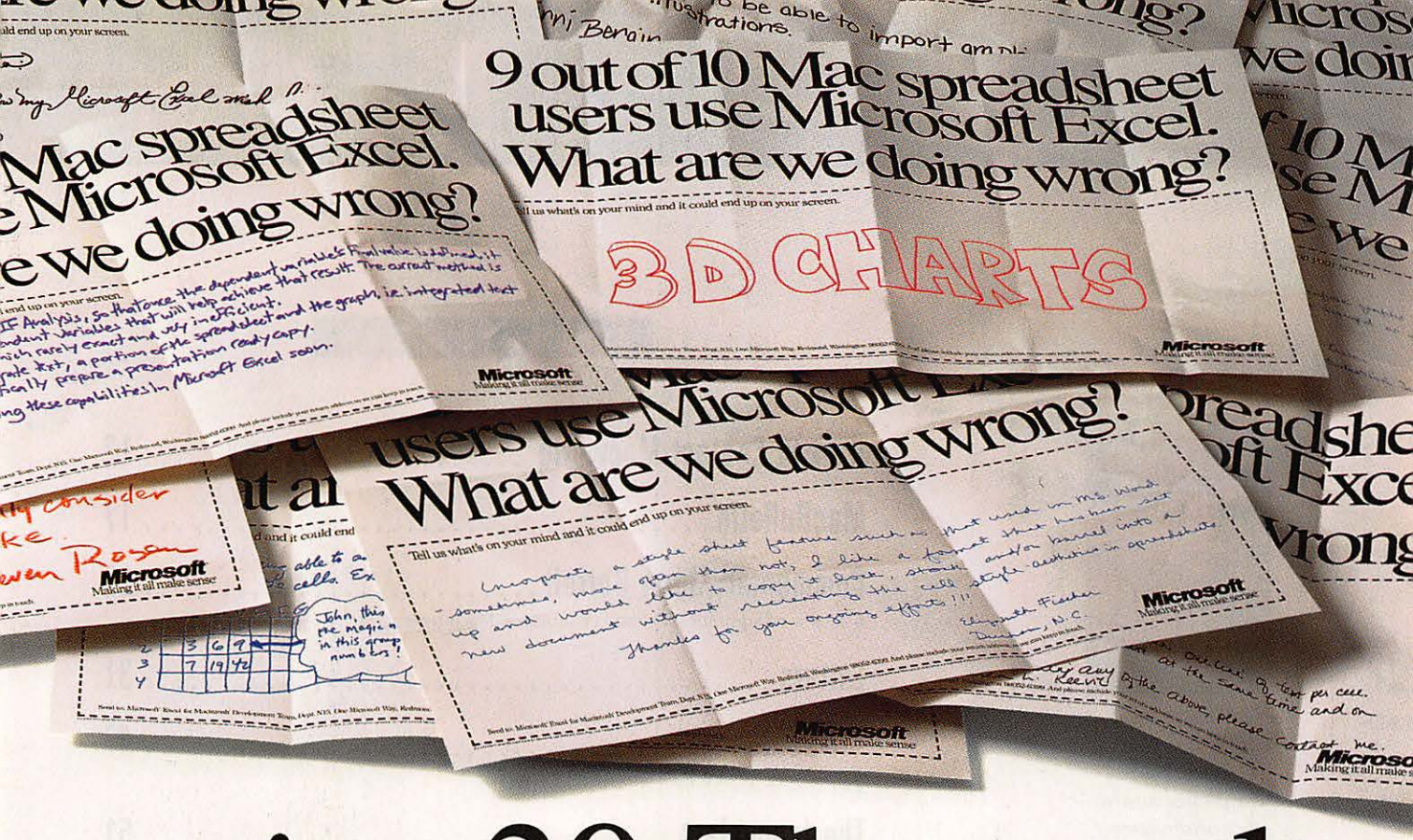
Highlight a row or column of numbers, hit the Σ button (that's Autosum™), and *voilà* – it all adds up.

Do quick, push-button formatting. Use outlining features to collapse

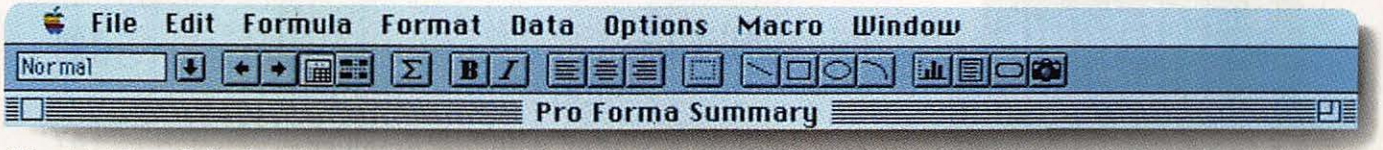


Yes, Paul, a single button now lets you access 68 chart types, 24 of which are 3-D. You can incorporate these right into your worksheet, along with text and data. And notice the outlining feature on the left? Go nuts.

*Plus shipping and handling and applicable sales tax. If you are a registered user of Microsoft Excel, watch your mailbox for an update coupon. Offer good only in the 50 United States. In the 50 United States, call (800) 541-1261, Dept. Q83. For information only Microsoft Corporation. Mac is a registered trademark of Apple Computer, Inc.



version 3.0. The result respondence course.



Take a look at the new Toolbar. In one step, you can now access style sheets, outlining features, Autosum, formatting options, drawing tools, charts of all kinds and macros. Go to town.

or expand worksheets without having to create multiple files.

As for charting, we took our cue from Paul Woods, who began his letter with the salutation, "Charts, charts, charts!" Hey, Paul – check out the picture and caption for the full scoop.

Did we mention that you can consolidate up to 255 worksheets at a time, regardless of format?

Or the Goal Seek feature, which lets you put in the total you want and works backwards from there to fill in the variable you need?

Or the fact that this is the first System 7.0 application available?

Plus, you can update to version 3.0 for $129. If you acquired your current version of Microsoft Excel on or after 12/7/90, the upgrade is only $50*. Call (800) 541-1261, Department Q83, to find out more.

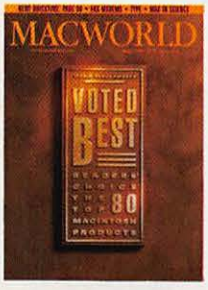
By the way, Bryan Larson: we said hi to Bill for you. He sends his regards.

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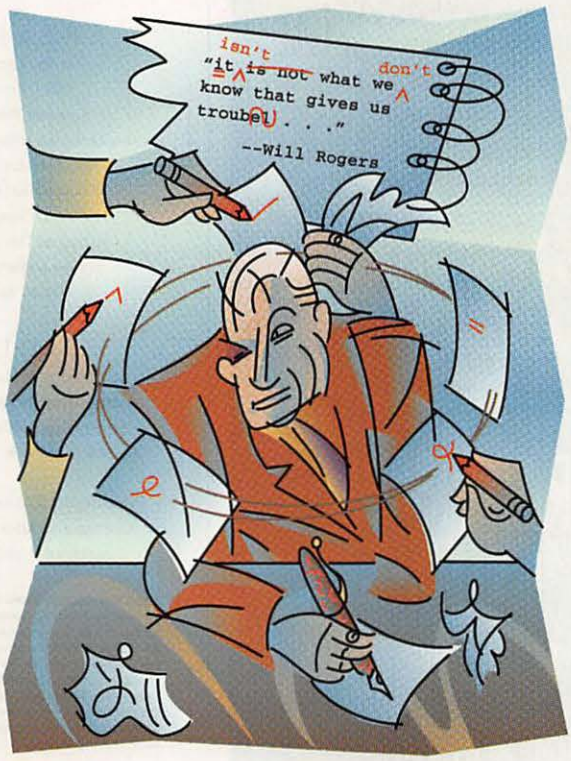
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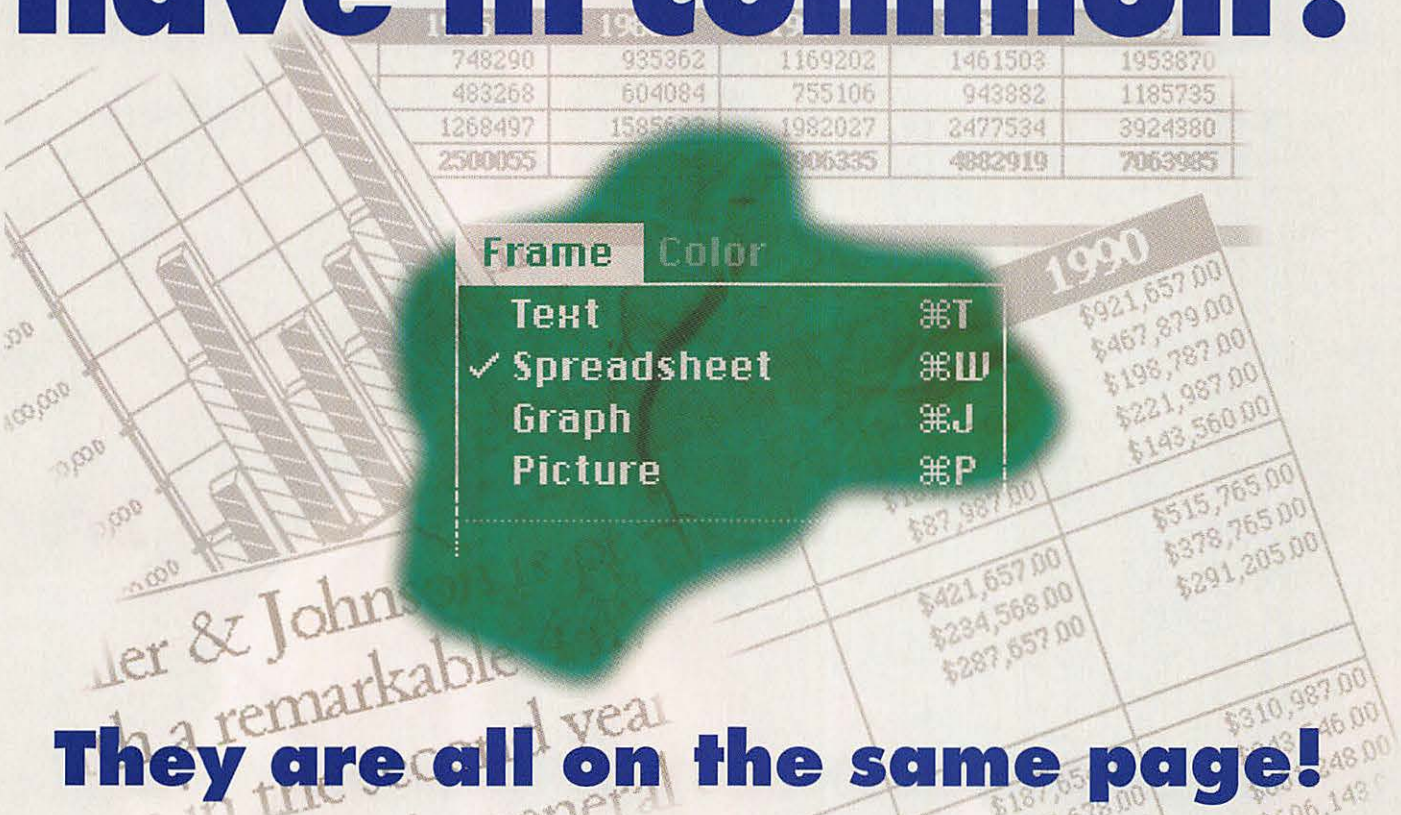
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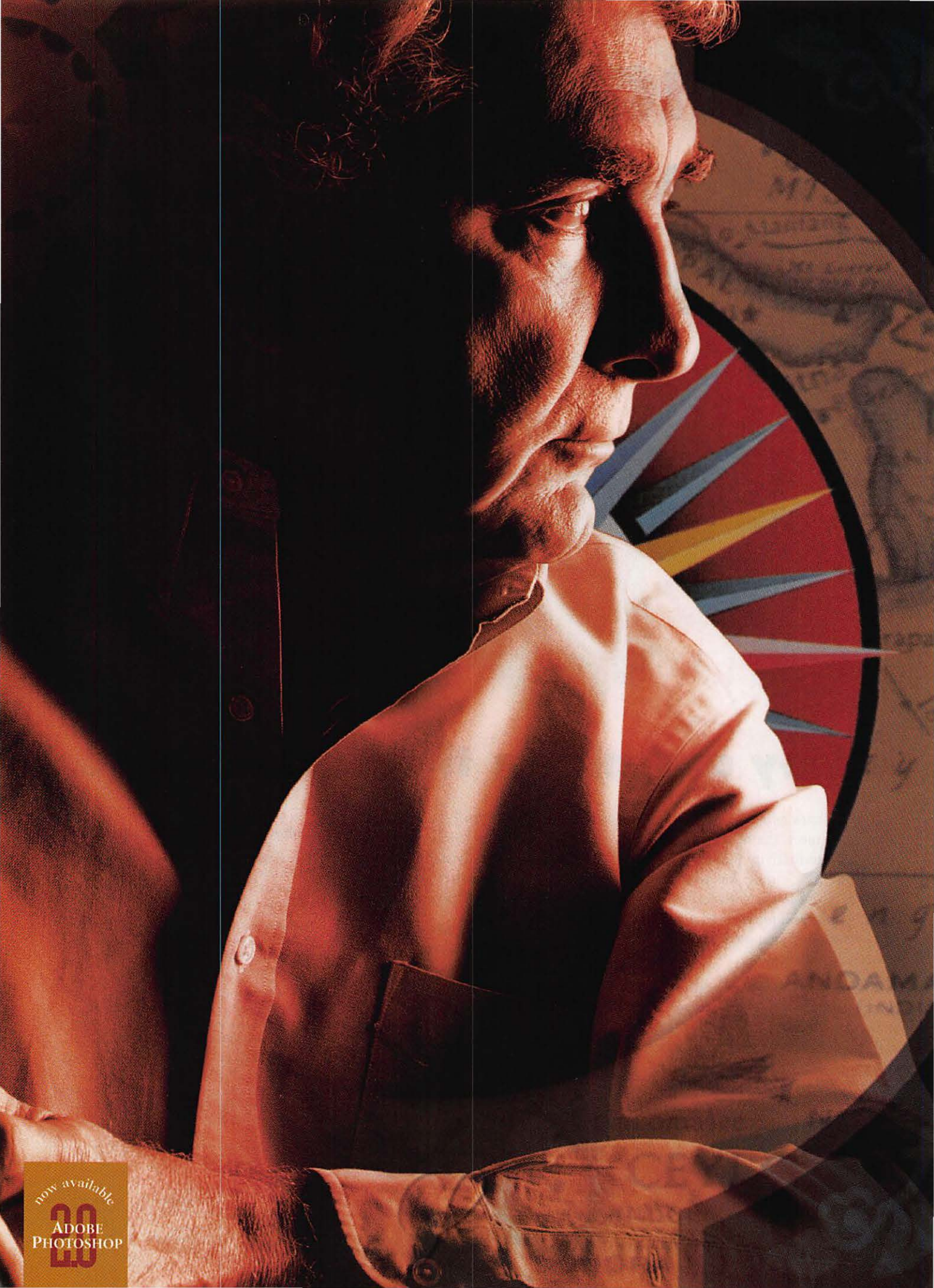
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Calls	09/17/86	100	$4.50	$233.75	$45,[illegible]	11/13/86	$3.00	$305.00	$68,445.00	$23,211.25
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Calls	05/06/87	100	$3.75	$237.50	$37,712.50	05/[illegible]/87	$2.00	$209.25	$22,290.75	($15,420.50)
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Calls	05/16/88	100	$4.63	$237.50	$46,[illegible]	05/16/88	$4.63	$237.50	$52,243.75	$5,756.25
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Puts	05/10/89	100	$2.63	$209.25	$26,459.25	05/12/89	$1.75	$209.25	$17,290.75	($9,168.50)
Calls	07/06/89	100	$5.75	$271.25	$57,771.25	07/14/89	$25.00	$673.25	$249,326.75	$191,555.50
Calls	08/24/89	100	$3.63	$209.25	$36,459.25	08/25/89	$8.13	$342.50	$80,907.50	$44,448.25
Calls	09/28/89	100	$4.13	$222.50	$41,472.50	10/09/89	$11.25	$436.25	$112,063.75	$70,591.25
Calls	12/29/89	100	$4.13	$222.50	$41,472.50	01/03/90	$8.25	$346.25	$82,153.75	$40,681.25
Puts	01/09/90	100	$5.50	$263.75	$55,263.75	01/15/90	$13.00	$488.75	$129,511.25	$74,247.50
Puts	01/16/90	100	$8.75	$361.25	$87,861.25	01/24/90	$14.88	$545.00	$140,205.00	$52,343.75
Puts	02/21/90	100	$4.25	$226.25	$42,726.25	02/26/90	$2.94	$106.00	$29,188.13	($13,538.13)
Calls	03/16/90	100	$6.63	$297.50	$66,547.50	03/20/90	$10.00	$398.75	$99,601.25	$33,053.75
Calls	04/12/90	100	$5.50	$263.75	$55,263.75	04/16/90	$8.25	$346.25	$82,153.75	$26,890.00
Puts	04/19/90	100	$5.00	$248.75	$50,248.75	04/27/90	$10.00	$398.75	$99,601.25	$49,352.50
Calls	05/09/90	100	$4.75	$241.25	$47,741.25	05/14/90	$19.25	$676.25	$191,023.75	$144,882.50
Calls	06/22/90	100	$6.63	$297.50	$66,547.50	06/25/90	$3.63	$207.50	$36,042.50	($30,505.00)
Puts	08/07/90	100	$7.88	$335.00	$79,085.00	08/24/90	$22.25	$766.25	$221,733.75	$142,648.75
Calls	01/17/91	100	$12.88	$485.00	$129,235.00	01/18/91	$19.00	$668.75	$189,331.25	$60,096.25
Calls	01/31/91	100	$18.63	$417.50	$106,667.50	02/13/91	$32.00	$1,058.75	$310,941.25	$212,273.75
Calls	04/16/91	100	$3.13	$192.50	$31,442.50	04/18/91	$9.50	$383.75	$94,616.25	$63,173.75
Puts	04/22/91	100	$5.38	$268.80	$54,010.00	04/26/91	$7.00	$380.75	$69,691.25	$15,681.25
Puts	05/02/91	100	$5.25	$256.25	$52,756.25	05/15/91	$11.50	$443.75	$114,556.25	$61,800.00
										$3,460,885.67

The Saga Continues: 1990 profits = $52,256.88 and Continues. 1991 profits = $413,025.00

76.79% Accurate: *Above is a chart of OEX trades from December 28, 1984 to May 15, 1991, based on the signals generated by the* ***Right Time-Index Program***™*. By following the signals generated by the program, the rules in the manual and starting with just a small amount of capital ($30,209.25) your profits would have been over $3,400,000.00.*

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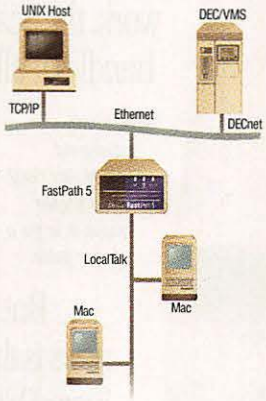
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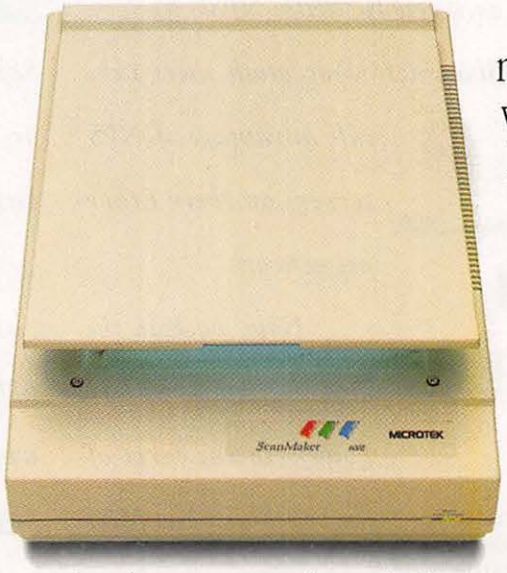
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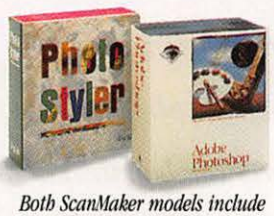
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The totally redesigned ScanMaker 600Z offers higher resolution for a lower price.

But the most dramatic news is that we've given it an incredible low price to match. Add to that a sleek, compact design that fits neatly in your work space. And you've got the color scanner that others will be hard pressed to match.



Both ScanMaker models include either PhotoStyler or Adobe Photoshop, absolutely free.

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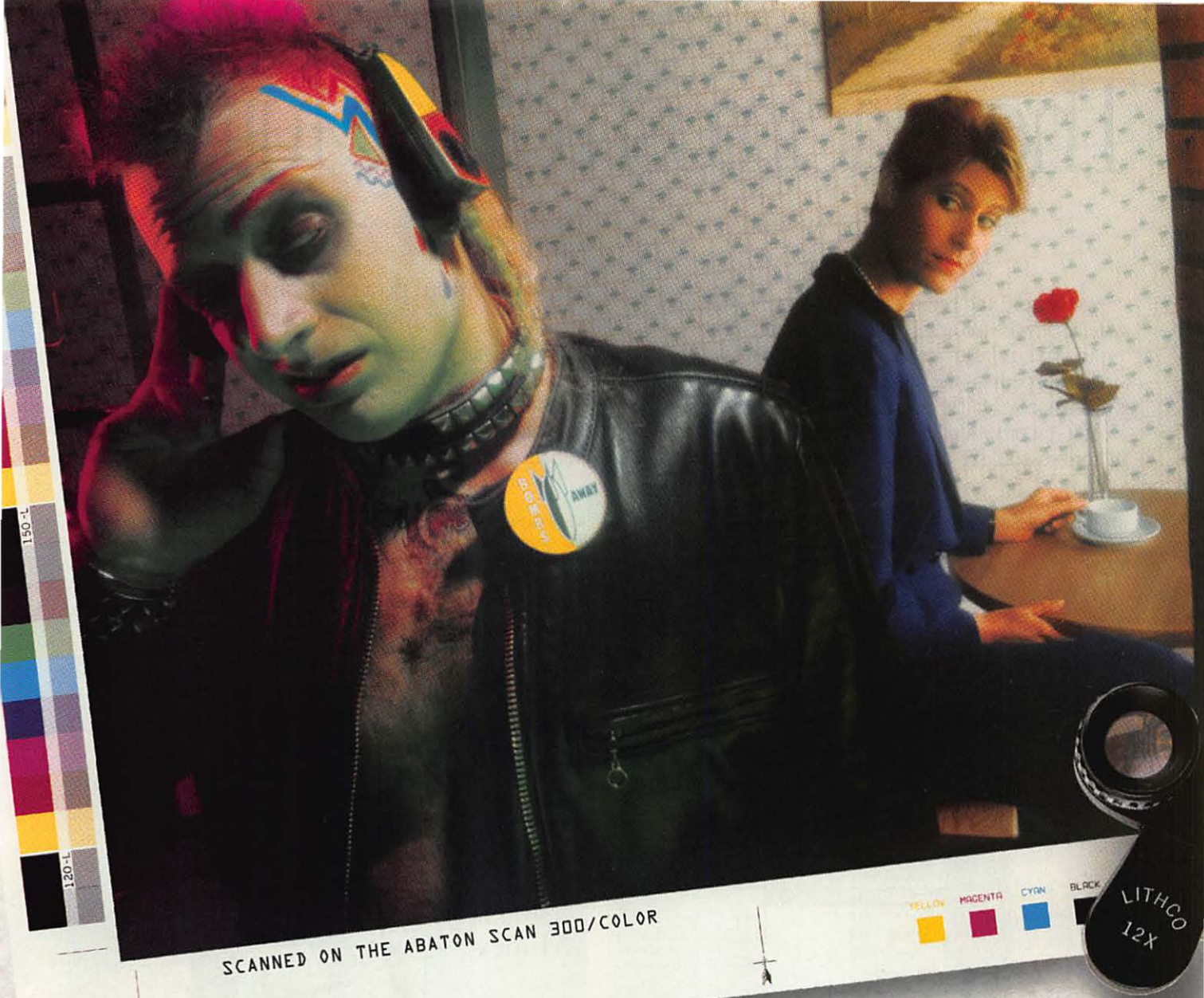
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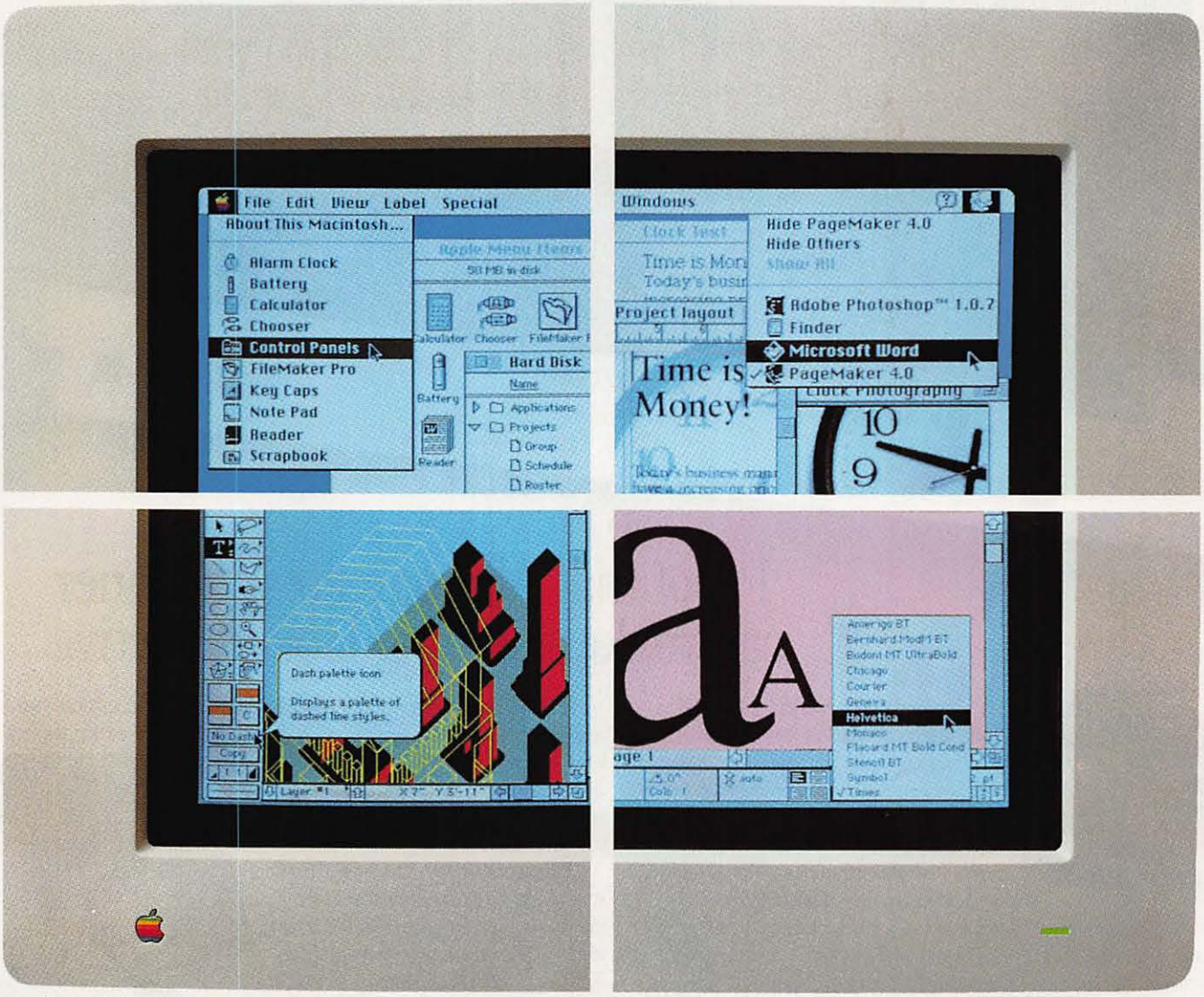
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MACBULLETIN

GCC Unveils $1599 PostScript Printer

GCC Technologies introduced the BLP Elite, a 4-pages-per-minute PostScript printer that lists for $1599. Based on the same Oki print engine as GCC's other popular printers, the BLP Elite differs in its low-cost PostScript controller. The controller includes a 10MHz 68000 processor, 17 PostScript fonts, and 2MB of RAM, expandable to 4MB through a board-swap upgrade. The printer has two connectors: an RS232C port, and a DB8 connector that can link to either an AppleTalk device or an RS422 serial port. GCC will also offer the controller board as a $799 PostScript upgrade for its PLP II QuickDraw printer. Both the printer and the controller upgrade shipped in May. Contact GCC at 617/890-0880 or 800/422-7777.

Dirty ROMs

Apple has been haranguing programmers for well over two years to write 32-bit-clean code in preparation for System 7, but early adopters have discovered that Apple wasn't listening to its own advice: ROMs in the Mac II, IIx, IIcx, and SE/30 are not 32-bit clean. As a result, those machines can access only 14MB of virtual memory and 8MB of RAM. Apple says it is unlikely to develop replacement ROMs or a software patch, even for the SE/30, which the company still manufactures and sells. Connectix Corporation has a new product called Mode32 that patches the ROMs and allows the older machines to use 32-bit addressing. An Apple spokesperson said Apple worked with Connectix to debug Mode32, which lists for $169. Connectix is at 415/324-0727.

Apple Cuts Prices on Upgrades

Apple has cut the suggested retail prices of its CPU logic board upgrades and RAM add-ins. The SE/30 Logic Board Upgrade for the SE dropped from $1699 to $999. The IIci Logic Board Upgrade for the Mac IIcx went from $2399 to $1499. The IIfx Logic Board Upgrade was reduced from $2999 to $2599. All the CPU upgrades support the virtual memory capability of System 7, and all require additional RAM. The IIci and IIfx upgrades also provide true 32-bit addressing of up to 1 gigabyte of RAM. Apple also cut the prices for its RAM upgrades by amounts ranging from 50 to 58 percent. Contact your Apple dealer.

Apple Execs Found Liable in Stockholder Suit

Two former Apple officers were found liable in a stockholder class action suit that charged they failed to make important disclosures regarding the development of the "Twiggy" hard drive in 1982. The federal district court jury verdict against former CEO A. C. (Mike) Markkula, Jr., and John Vennard, former vice president, peripherals product division, may result in a judgement of $2.90 for every share of stock sold between November 29, 1982, and September 23, 1983. Apple said it will contest the verdict against the two. The jury exonerated Apple itself, founder Steve Jobs, and another former officer.

Apple to Lay Off 1500 Employees

Trying to restore its profit margins to their pre-low-cost-Mac glory, Apple Computer will reduce its worldwide work force of 15,600 by about 10 percent. The reduction will be achieved largely by layoffs and partly by attrition, with marketing personnel and overseas staff most affected. Apple also is cutting some layers of management. The company characterized the changes as part of its strategy to gain market share. The unexpectedly large demand for low-cost Macs means that the company must cut its costs faster than planned, according to Apple.

SuperMac Takes QuickDraw to Workstation Performance

Claiming to have twice the speed of Apple's 8•24 GC graphics accelerator board, SuperMac has brought out the Spectrum/8•24 PDQ and Spectrum/8•24 PDQ si, QuickDraw accelerators for NuBus Macs and the Mac IIsi, respectively. The new boards support monitors from 12 to 21 inches, with 24-bit images on smaller screens and 8-bit images on the larger displays. Both boards give sustained graphics performance equivalent to Silicon Graphics' midrange workstations, with a peak transfer rate of 500 million pixels per second, according to SuperMac. The design supports the NuBus block-transfer mode and adds new methods of getting data off the NuBus faster. The new boards ship on June 25 at a suggested list price of $1399. For more information, call SuperMac at 408/245-2202.

Apple Ships New Macintosh LC Configurations

Apple has added two configurations of the Mac LC. The first includes the CPU, 2MB of RAM, a 40MB hard drive, and 512K of display VRAM (but no key-

(continues)

board). That configuration lists for $2499, the same as the original configuration, still offered with 2MB of RAM, a 40MB hard drive, 256K of VRAM, and a keyboard. The second new configuration has 4MB of RAM, an 80MB hard drive, and 512K of VRAM, also without a keyboard. It lists for $2999. For more information, contact your Apple dealer.

Siclone Blown Away

Siclone Sales and Engineering, maker of Macintosh accelerator boards, has gone out of business and its product line has been taken over by Applied Engineering, according to representatives of the companies. Applied Engineering said it would support owners of existing Siclone products. At press time, Siclone's phones were in the process of being forwarded to Applied Engineering. For more information, contact Applied Engineering at 214/241-6060.

Proxima Shows LCD Projection Panel with TV

Proxima Corporation has introduced Ovation, a color LCD projection panel that can display analog TV images in a window. Designed for high-end presentations, the active matrix LCD panel can produce 24,000 colors. It can accept video input from a VCR or another TV source. Ovation was slated to begin shipping in June. Its list price was not set at press time but was expected to be under $9000. For more information, contact Proxima at 619/457-5500.

FreeHand and Illustrator Talk

A file-conversion utility from FreeHand developer Altsys is designed to solve a thorny problem for artists who work in both Aldus FreeHand and Adobe Illustrator. EPS Exchange installs options for Illustrator 88 and Illustrator 3.0 formats in FreeHand's Save As dialog box. It lists for $149. Altsys is also developing Illustrator-to-FreeHand and FreeHand-to-PICT converters. For more information, contact Altsys at 214/680-2060.

Excel's New Menu

Spreadware Statistics Menu is a $98 macro that adds to Microsoft Excel a new menu with commands for performing a wide range of statistical manipulations directly on an Excel worksheet, including calculation of probabilities, descriptive statistics, nonparametric statistics, ANOVA, correlations, and other analyses. It works with Excel 2.2 and 3.0, and there is also a version for Wingz. For more information, contact Spreadware at 619/347-2365.

QuicKeys' New Events

Version 2.1 of QuicKeys adds the ability to send and respond to AppleEvents under System 7 to pass data between applications and carry out functions such as printing or opening files on the desktop. A utility called CE/IAC that will be bundled with QuicKeys 2.1 can direct traffic between INITs under System 7 (it is also designed to work with UserLand's Frontier—see following bulletin). QuicKeys' list price remains $149. For more information, contact CE Software at 515/224-1995.

The Missing Link

An ambitious project at UserLand Software is aimed at providing a way to manipulate the Mac as a whole—for example, to issue a command that sends several documents to several different printers. UserLand's Frontier is essentially a scripting language that can issue any command the Mac knows how to execute; a QuickScript window, similar to HyperCard's Message window, is available everywhere. What's the catch? Developers have to modify their applications to work with Frontier—UserLand says ten applications will be Frontier-compatible by the end of 1991—and users have to think like programmers. UserLand is at 415/325-5700.

The Uncompilable HyperCard

Symmetry Software Corporation, which publishes HyperDA for reading stacks from a desk accessory without running HyperCard, is developing StackRunner, a tool for installing HyperDA's engine into stacks to make them double-clickable files whose contents can be browsed, searched, edited, and printed. StackRunner will run some XCMDs (Symmetry is developing a specification for an XCMD standard that it hopes will catch on), and StackRunner documents can be converted back into HyperCard documents. It will list for $99 and include a license to distribute 250 copies of the engine. Symmetry is at 602/998-9106.

Computer Users Sue for Civil Liberties

Steve Jackson and the Electronic Frontier Foundation have filed a civil suit against the United States Secret Service and others. The plaintiffs seek to establish constitutional rights for electronic media and to redress "unlawful search, seizure, and prior restraint on publication." Last year Steve Jackson Games was raided by the Secret Service, which seized the Austin, Texas–based company's bulletin board system and computer equipment even though the company itself was not suspected of wrongdoing (see *The Iconoclast,* March 1991). "We intend to fight for broad constitutional protection for operators and users of computer bulletin boards," said Electronic Frontier Foundation president Mitch Kapor.

Truevision Becomes Subsidiary of RasterOps

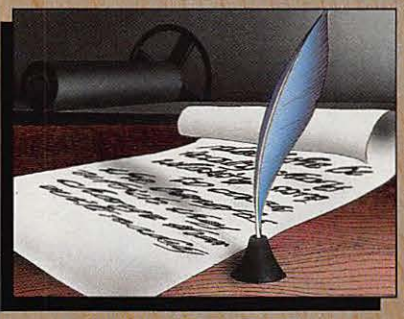
Truevision, a major supplier of video boards for PCs and Macs, has agreed to merge with RasterOps Corporation, one of the top three Mac display vendors. The companies said that Truevision's strength in the PC market should complement RasterOps' position in the Mac cosmos. The merger should be complete by August, according to RasterOps. M

The Evolution of CAD

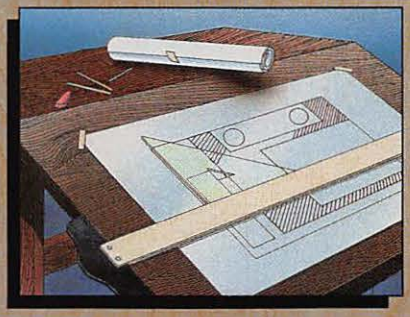
From the beginning of time, man has tried to express himself through graphics.



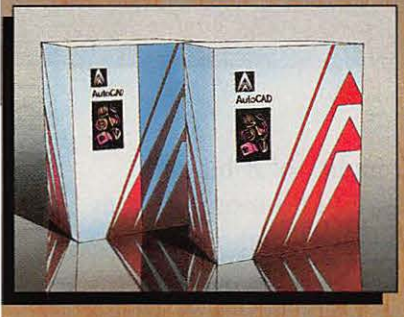
In the beginning man had to use primitive tools for creating graphic designs.



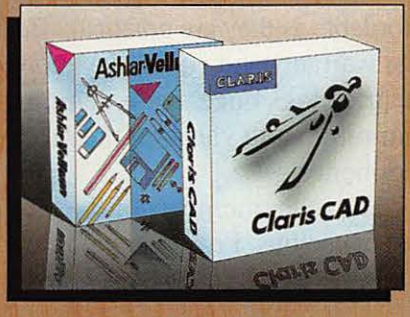
In the 15th Century design tools were quill ink pens and crude styles of paper.



By the 18th Century man had advanced to the drafting table with the T-squares, slide rules, precision ink pens and the dreaded eraser.



In the 20th Century the first CAD programs were very slow and extremely difficult to use, not to mention the expense of buying them.



As programs became easier to use, they thought they were radical and intelligent, but lacked real CAD power.

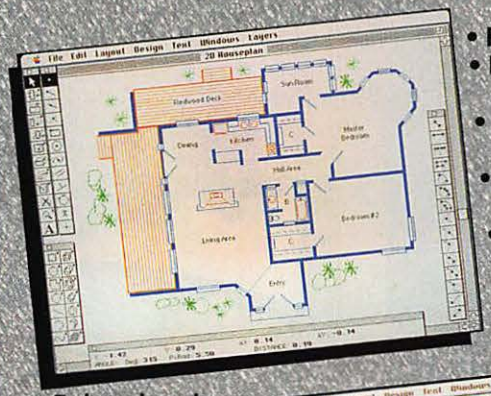
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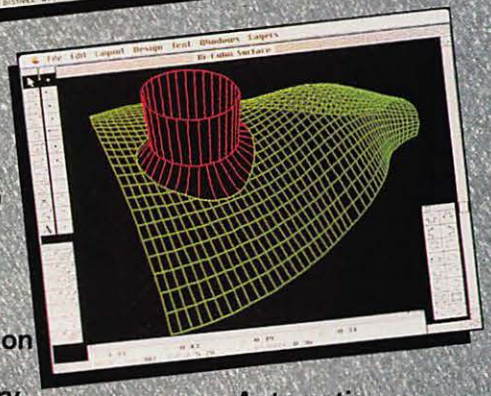
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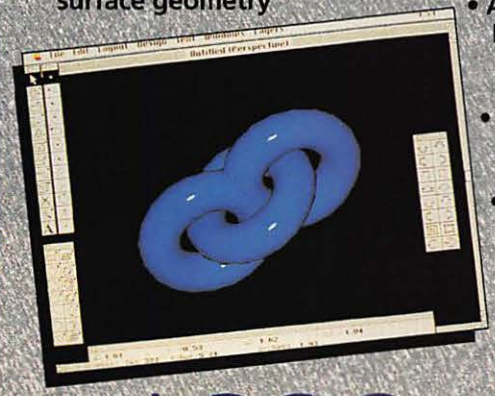
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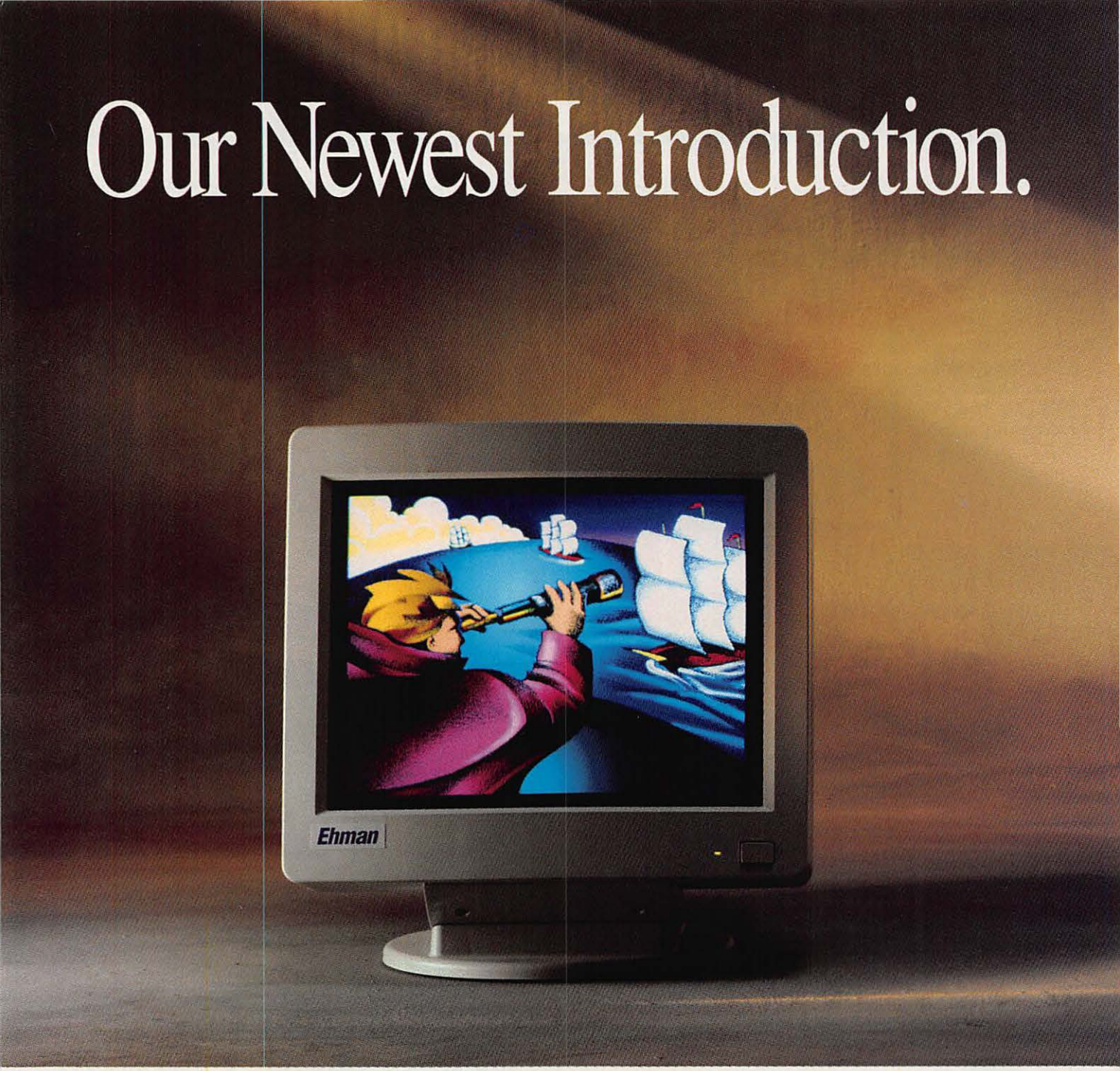
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Our Newest Introduction.



Color monitor illustration by Rob Mageira.

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Now allow us to introduce the newest member of our family; 20 inches of 8-bit and 24-bit color in high quality, 72 DPI monitors that end users will love, and budget watchers will adore.



All hard drives come bundled with your choice from two utility software packages and a 2-year warranty.

*Disk Doubler not available with 45MB removable

The new Ehman 2-page color monitors are as affordable as they are practical. Backed up by a one year warranty and our 30 day money back guarantee, the price tags once again demonstrate Ehman's commitment to value on the most popular peripherals.

The other members of the family are just as cost conscious. From the lightning fast "highly recommended" 660MB drive (*Macworld*, July 91)

No Introduction Needed.

"At $899, Ehman's Two-Page Monochrome display is an excellent buy."

MACWORLD, MAY, 1991

"If you want a full-page display, we recommend the Ehman: it's rare to find such high quality and low price ($499) in the same monitor."

MACWORLD, MAY, 1991



(MB)	800 K	20+	30+	40 EXT	52Q LPS	60+	80+	105Q	170Q	207MX	332W H/H	660WR F/H	45MB
Internal	Floppy Drive	$225	$245		$309	$285	$335	$405	$729	$699	$1,245	$1,949	Removable
External	$129	$269	$289	$249	$359	$319	$379	$459	$789	$749	$1,289	$1,999	$489
Color 20" Monitor 8-Bit $2,895 24-Bit $3,945					Monochrome/Gray Scale 19" Monitor Monochrome $895 Gray Scale $1,495					Monochrome 15" Monitor $495			

to our reliable 45MB removable and the popular monochrome monitors, you'll find our prices among the lowest in the industry, and our commitment to quality and service the highest.

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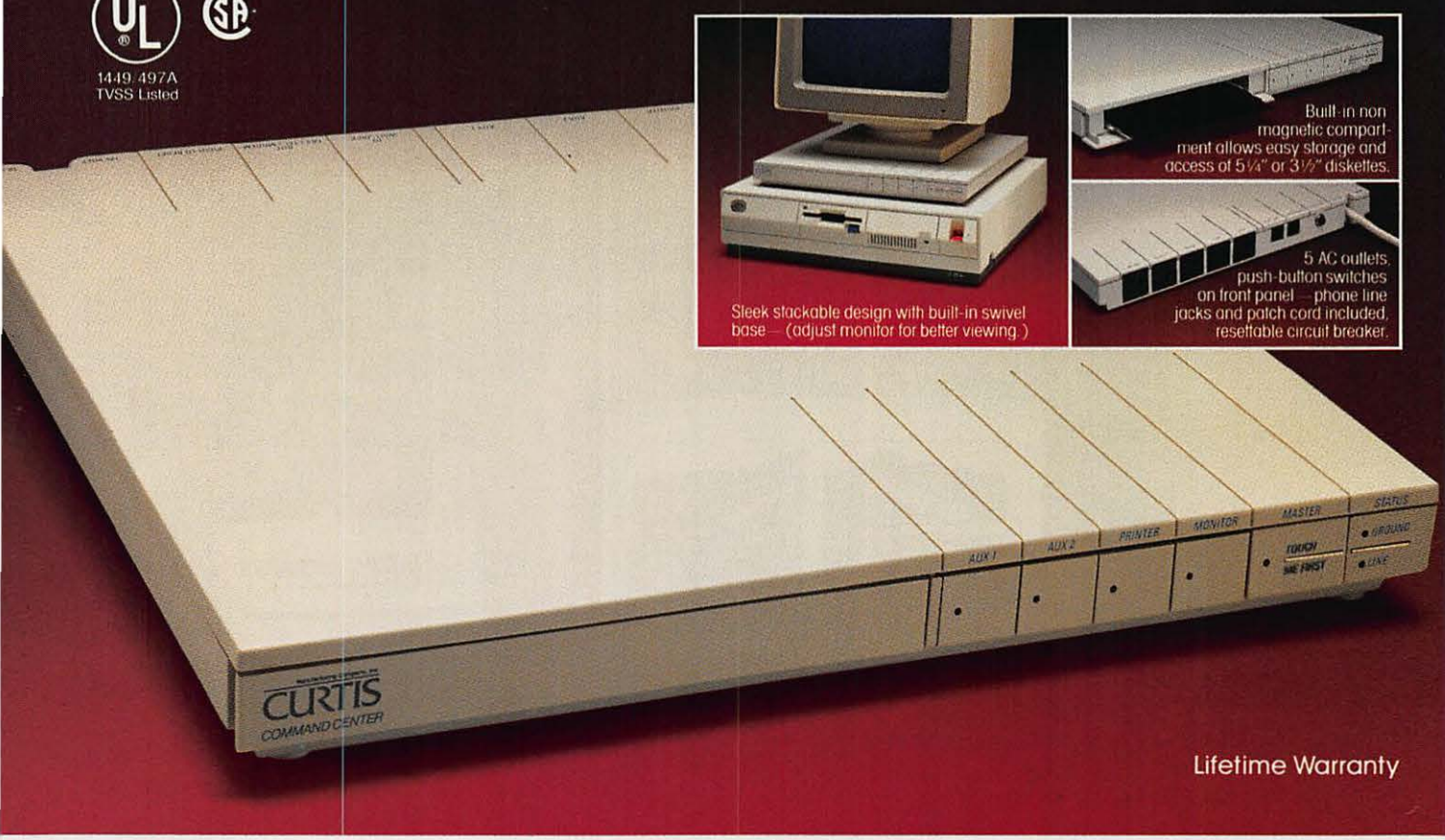
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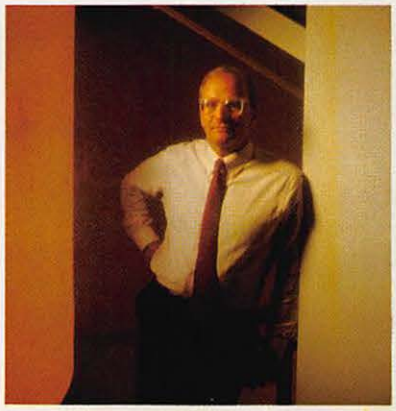
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The Mac Goes Hollywood

A SELECTION OF RECOMMENDED MOVIES FOR YOUR SUMMER VIEWING

BY JERRY BORRELL

Introducing the first annual collection of movie reviews based on films we could expect to see if all the world were as addicted to personal computers as the readers of *Macworld*. (With apologies to Pauline Kael and the *New Yorker*.)



Ap(ple)ocalypse Now
The unauthorized sequel to the classic film about the Vietnam era. Preserved in this remake are recognizable and compelling scenes, such as the one in which Colonel Kurtz, sitting in a darkened warehouse stuffed to the rafters with unsalable LC computers, leans forward into half shadow and mutters "the horror . . . the horror."

Especially effective is the assassin (played by a Martin Sheen look-alike) sent in to regain control of the situation by the board of directors. In this fascinating reference to the original film, the assassin wanders the halls of a ruined financial-planning organization, talking to himself about unclean methods, out-of-control executives, and the generally poor state of a once insanely great company.

Die Hard III
A German terrorist seizes control of a personal computer company. A Taiwanese, clone-making, joke-cracking entrepreneur saves Silicon Valley from the terrorist's domination by bringing a cheap clone to market. Massive layoffs, plummeting profit margins, and shyster stock analysts figure prominently in the plot—what else is new?

Fatal Attraction
Executives of a near-legendary Silicon Valley personal computer company become infatuated with UNIX and semiconductor RISC technology. This tale of casual lust leading ultimately to perdition holds a moral for all of us. In the end the company survives, but somehow life is never the same.

Ghost (Machine)
A surprise twist on the seemingly inexhaustible theme of someone dying and returning to mess with living people's lives. In this reprise the ghost of a high-tech company's founder returns to haunt his old company and wander the halls muttering "details, insanely great products, vision, and excellence." In this cynical treatment, people generally ignore the ghost and push past the apparition or pause only to hurl imprecations, remarks about the bottom line, and cruel observations about selling one's stock too early. Includes cryptic references to "the last person out of Bandley 3 turning off the lights."

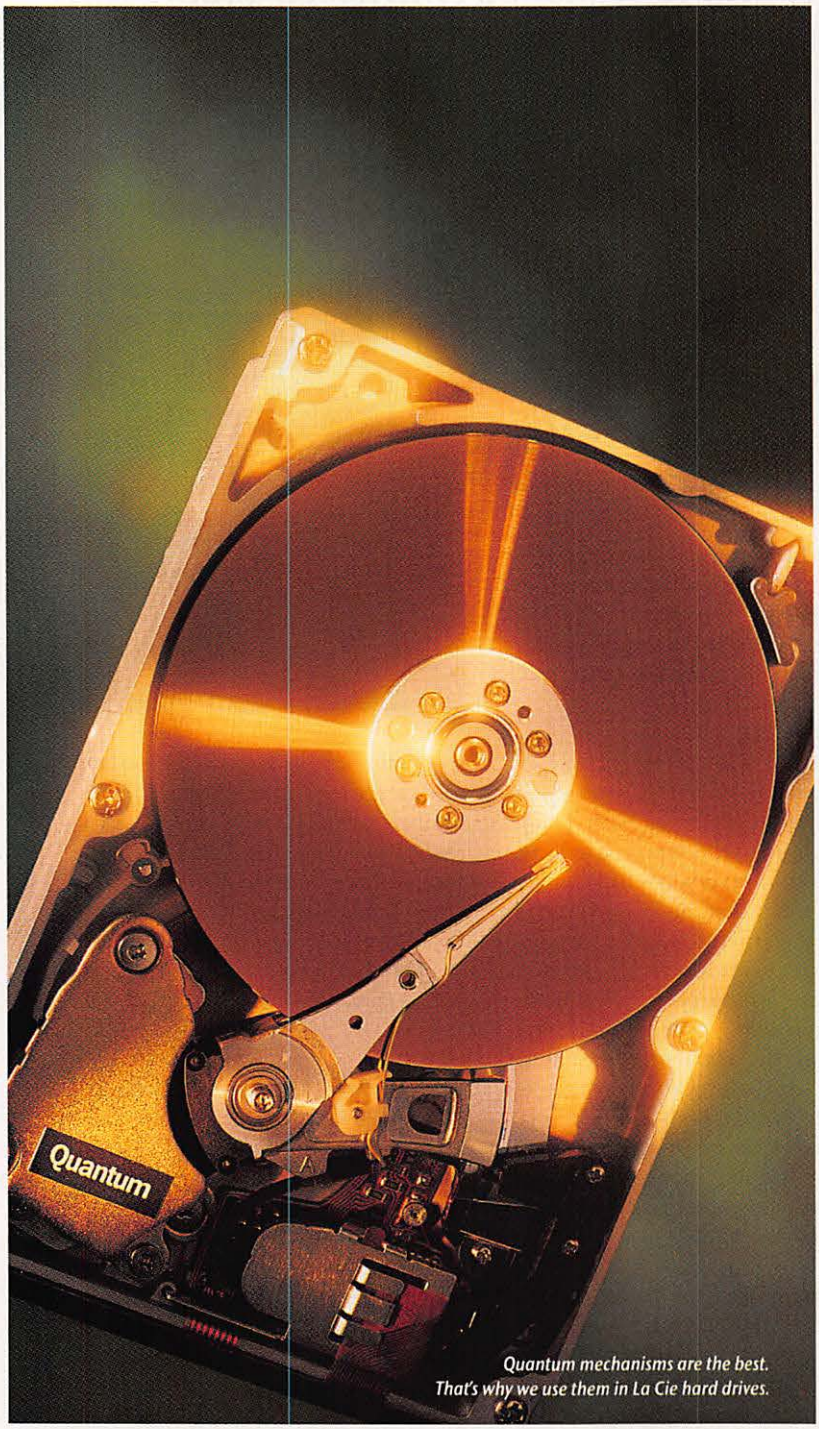
The House on De Anza Boulevard
From the novel by Stephen King about the violent and spooky goings-on at a corporate headquarters in Cupertino. Possessed executives run amok springing surprises on unwary employees. The company president takes to making random phone calls to workers, asking if they have Prince Albert in a can and other, less printable questions. The action starts with a series of incomprehensible corporate reorganizations and layoffs. All too late the employees realize that they're trapped on a one-way ride to Fry's Electronics. One of those occasionally powerful horror films, in the genre of *Chainsaw Massacre on De Anza Boulevard*. You'll either love this film or blow your sprouts all over the gray industrial carpet.

Macula
First there was Dracula, then Blacula, then Rockula, so there had to be a Macula. The enthusiasm of a large group of middle-aged men for a computer turns them into bloodthirsty, self-indulgent, detached, fixated, neurotic computer hackers. Many references to the classic film *Reefer Madness* as the computer lovers quickly change from outgoing family men with mild personal-hygiene problems to reclusive, functionally illiterate hackers who spend Saturday afternoons in their basements trying to debug system software with MacNosy. Sports widows may learn that there is a fate worse than playoff season.

(continues)

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3

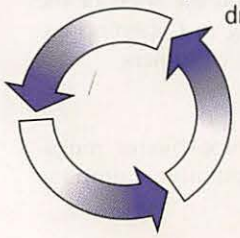
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†Restrictions apply. Please contact La Cie for complete warranty information.

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6

Rave Reviews from Critics and Customers.

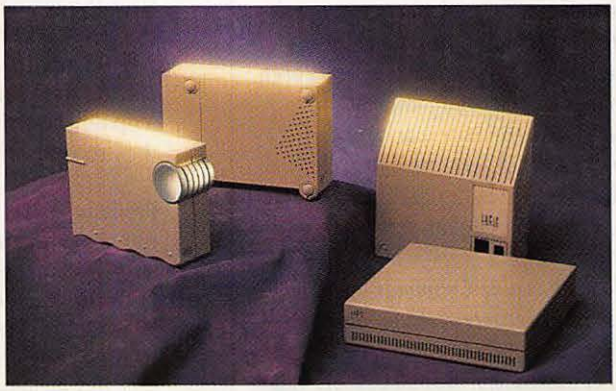
Frankly, there's been a lot of talk about La Cie hard drives. Leading Macintosh consumer magazines praise us. Customers write us fan letters. In fact, we're happy to let critics and customers have the last word about La Cie drives. Because they tend to be words like these:

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Modern Times (in Cupertino)
A remake of the classic, set in modern-day Silicon Valley. The contemporary Charlie Chaplin character is played by a hapless midlevel worker in a Fortune 100 company who wanders into the control room of the manufacturing plant and begins throwing levers, causing massive foul-ups.

Tens of thousands of Mac Classics spew from the assembly line. Operating divisions run at high speed to meet orders emanating from the control room—orders that set employees running in opposite directions for disparate goals. Fleets of trucks speed the computers across the nation to outlets at which the profitless products are sold to eager recipients. The company is hurtled into a constant stream of reorganization—instigated by our hero—but there is no way out. He is forced to continue reorganizing, or everyone will see what a mess the company is really in.

Nine to Five
What happens when a group of women executives in a high-tech corporation are promoted to the level of director and vice president only to meet EEO requirements? Get this—after the women are elevated it turns out that all the real decisions are passed up to the executive board, leaving them in the cold. There's hell to pay when the new execs find out they're only window dressing.

Predator
Bill Gates in the role of a voracious, all-powerful, guilefully dissembling entrepreneur. One of the summer's best stories—this whiz kid from hell tromps over countless other companies in his quest for domination. Ultimately, power and the riches of Croesus overcome the predator, making him vulnerable to attack from the film's hero, a German mercenary who, disguised as an industrial technocrat, cleans the predator's clock. This film is not recommended for small children, idealistic adults, or Microsoft stockholders.

Raiders of the Last Mac
A group of unimaginative marketers steal the heritage of a small computer that had a chance for greatness. Jimmy Stewart should have been cast as a loyal employee who points out to the public what's going on, but alas, no one of that stature was available and the role was cut. So the bad guys are free to usurp the machine that was supposed to have been the people's computer.

Revenge of the Nerds
After years of watching corporate overlords take home millions of dollars based on the products nerds designed, a group of engineers get together and cook up a plan that brings their company to its knees—until the engineers win a suitable financial reward. Babes, Jolt cola, and the kind of humor that only 12-year-olds could enjoy. Nevertheless, a message that some highly paid executives might want to consider (particularly those bringing down multiple millions).

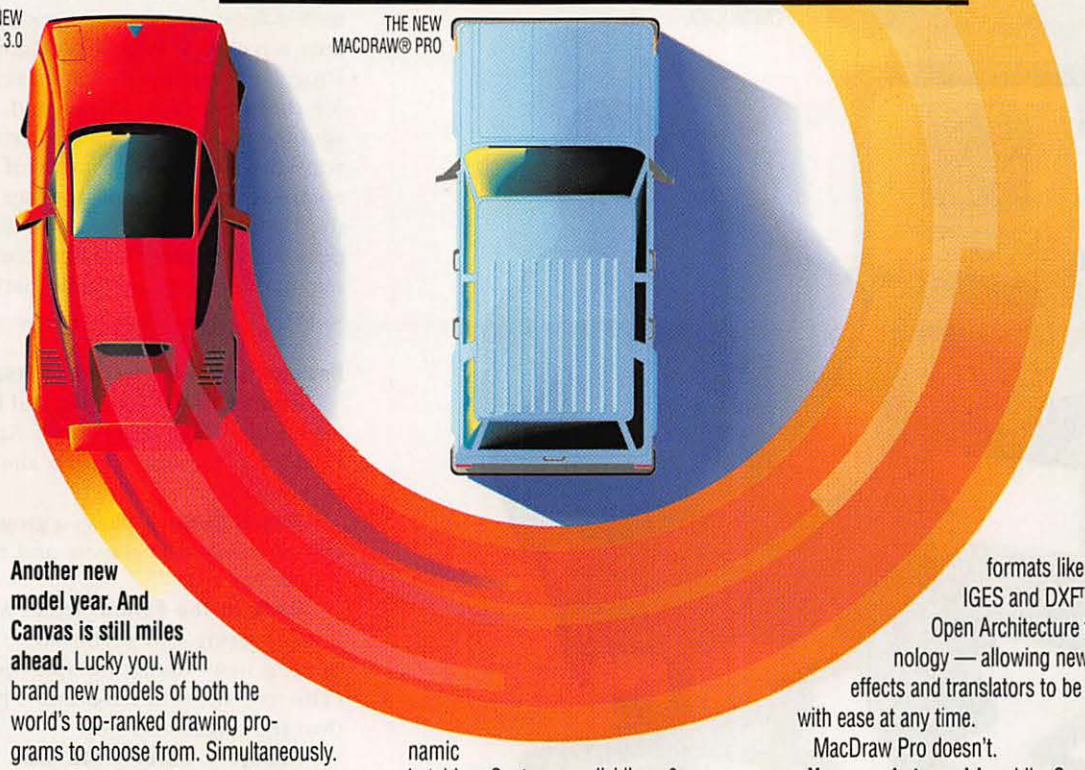
Sabbatical Night Fever
Five- and ten-year veterans of Apple Computer cope with midcareer crises as they take off for six-week vacations. But while they're gone, their entire work lives are changed without their knowledge. A poignant story about talented engineers and managers who arrive at their old offices only to find new inhabitants and all their worldly goods packed up in boxes and lying in hallways.

Son of Macenstein
A reworked version of the original Macintosh Portable is foisted upon an unsuspecting public, who accept the machine due to unstinting market hype. Once people try the machine, they decide it's truly awful. Sally Field plays the role of an indignant woman who spends all of her savings to buy the useless machine, thinking that it will help her kids through school, only to discover that it's a grotesquely bad product. The action starts when Field leads a consumer uprising and the walls of the corporate building in Cupertino are laid siege by irate customers.

Total Recall II
This summer's blockbuster mega-movie. A manipulative company

(continues)

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Unfortunately for Claris, our new Canvas 3.0 includes enough major enhancements to leave their latest effort idling somewhere back in the dust. Again.

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MacDraw Pro doesn't.

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MacDraw Pro doesn't.

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MacDraw Pro doesn't.

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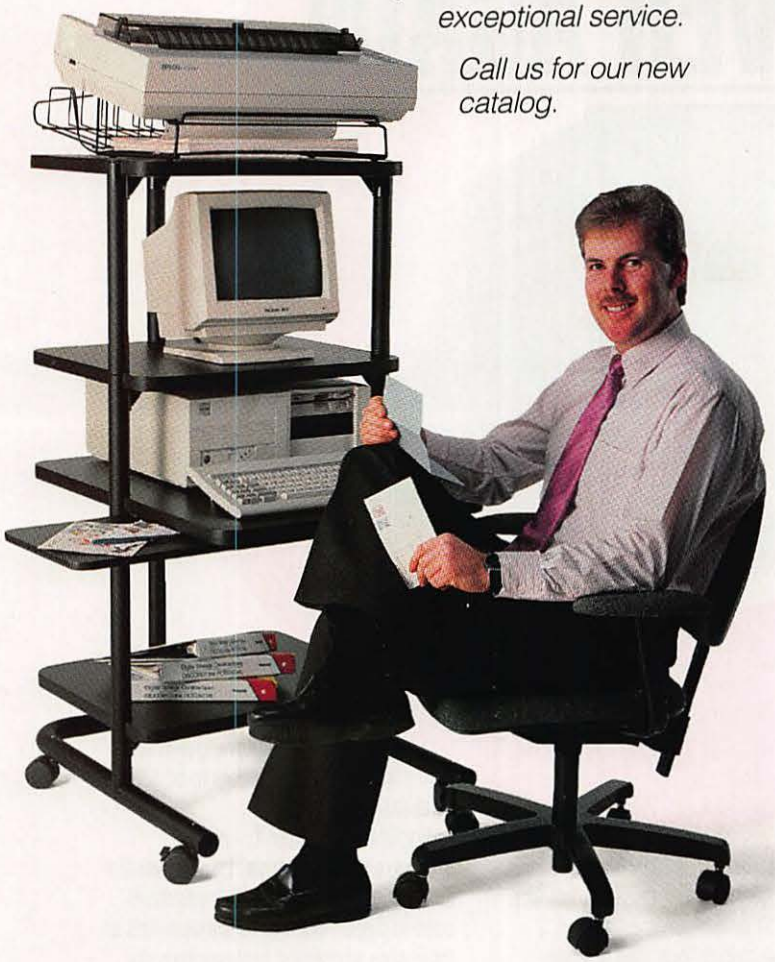
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president brings in a clever undercover agent to ensure his control of the company. The film is marred by the almost indecipherable German accent of the agent, and his penchant for rambling, pointless speeches that adumbrate the plot. Spectacular special effects promise a smash hit.

The company, a veritable high-tech colony in a former agricultural area, is rocked as the two protagonists struggle for control. Action makes up for the weak plot. In the end, the agent murders his old master and wins his true love (control of the company), realizing only too late that the bottom has dropped out of the personal computer market, leaving our hero with an unsalable backlog of product.

Reviews Scheduled for Future Issues

Aliens: Former HP, IBM, and DEC executives take control of Apple Computer, turning it into a shell of its former self.

Animal House: Follows a group of bawdy software engineers and their shenanigans.

Back to the Future: Execs keep rediscovering old technology and putting new marketing spin on it. (This remake will have more parts than the original series.)

Honey, I Shrunk the OS: You thought 7.0 was a long wait, see what happens when a VP starts to think about 8.0.

Lawrence of San Jose: Wise guy steals the Mac OS, has delusions of Greek mythology, and is mugged by a "rental retired FBI guy."

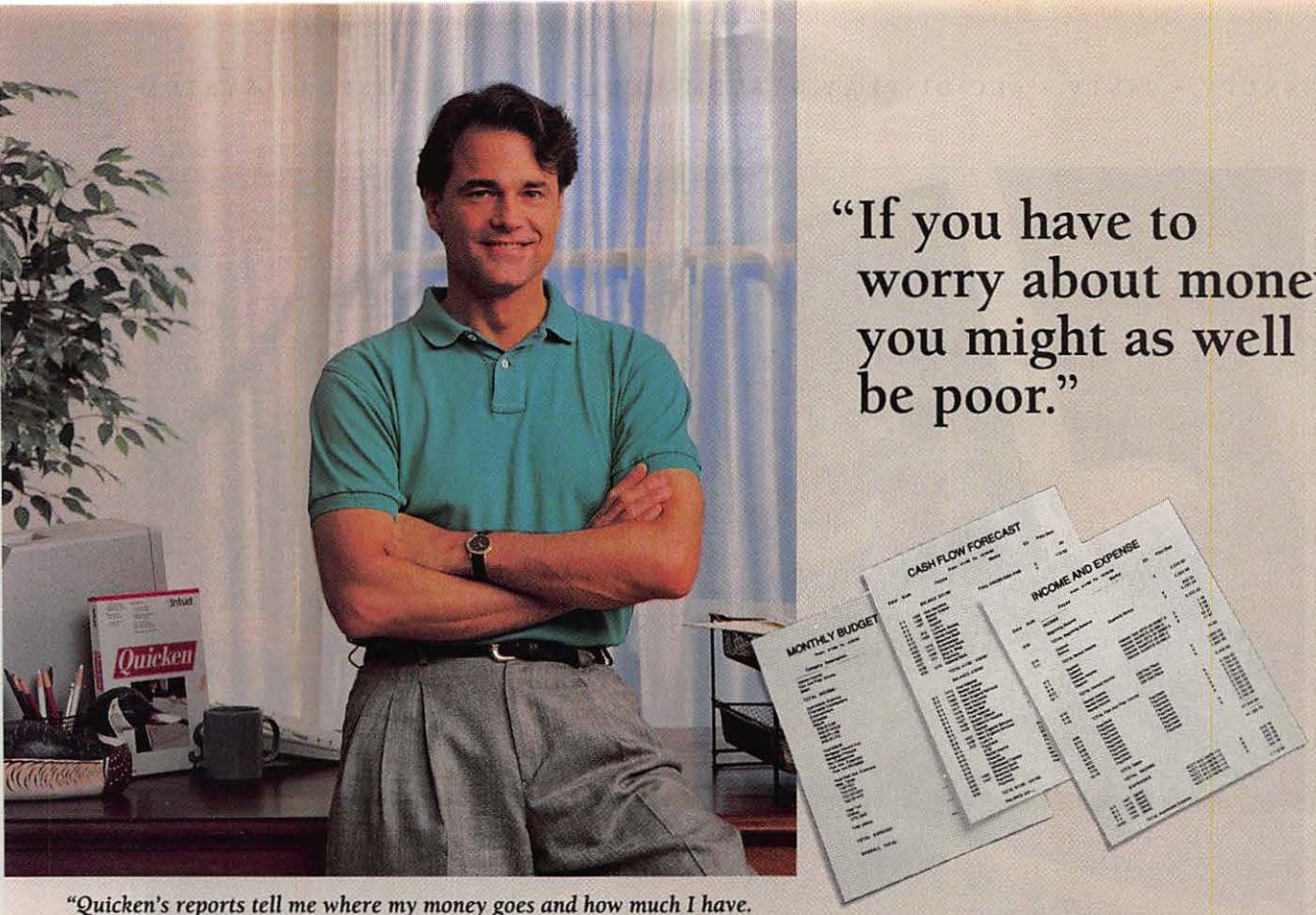
Star Wars, the Trilogy: Impenetrable plot as written by sycophantic Silicon Valley journalists. Similar to Kurosawa's *Rashomon* in that each teller has a different version of the story. By the end, nobody understands and nobody cares.

Tin Men: Hucksters pawn off old Mac Pluses and ImageWriters on elderly citizens.

Wall Street: Greed. More greed. Penury. Horse farms. Private jets. Extramarital affairs. Computers. Greed.

Wild at Heart (but Selling Long): The story of a group of high-tech stockbrokers, filmed in Bakersfield, California. M

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Where did my money go? As I pay my bills, Quicken automatically notes each type of expense — utilities, clothing, charity, whatever. Then a simple click gives me a report showing how much I spent in every expense category each month.

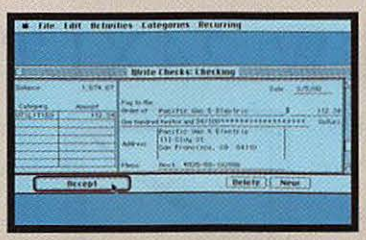
How am I doing? Another click shows my budget vs. actual. Credit application? In seconds I've got a financial statement showing income and expenses. Tax time? No sweat. Quicken provides one report with all my itemized deductions.

It's fast.

Time to pay bills? Quicken has "memorized" all my regular payments. I just confirm the amounts and Quicken prints out checks for me to sign. I still use my regular checkbook when it's more convenient. Either way, Quicken instantly keeps my accounts balanced and organized.

It's easy.

Getting started is no problem. There is no set-up involved. No chart of accounts to create. No stacks of old records to enter. I was recording checks in 3 minutes. That simple. Someday I just might read the rest of the manual to see what else Quicken can do.



"Quicken's windows look just like my checkbook. There is nothing new to learn."

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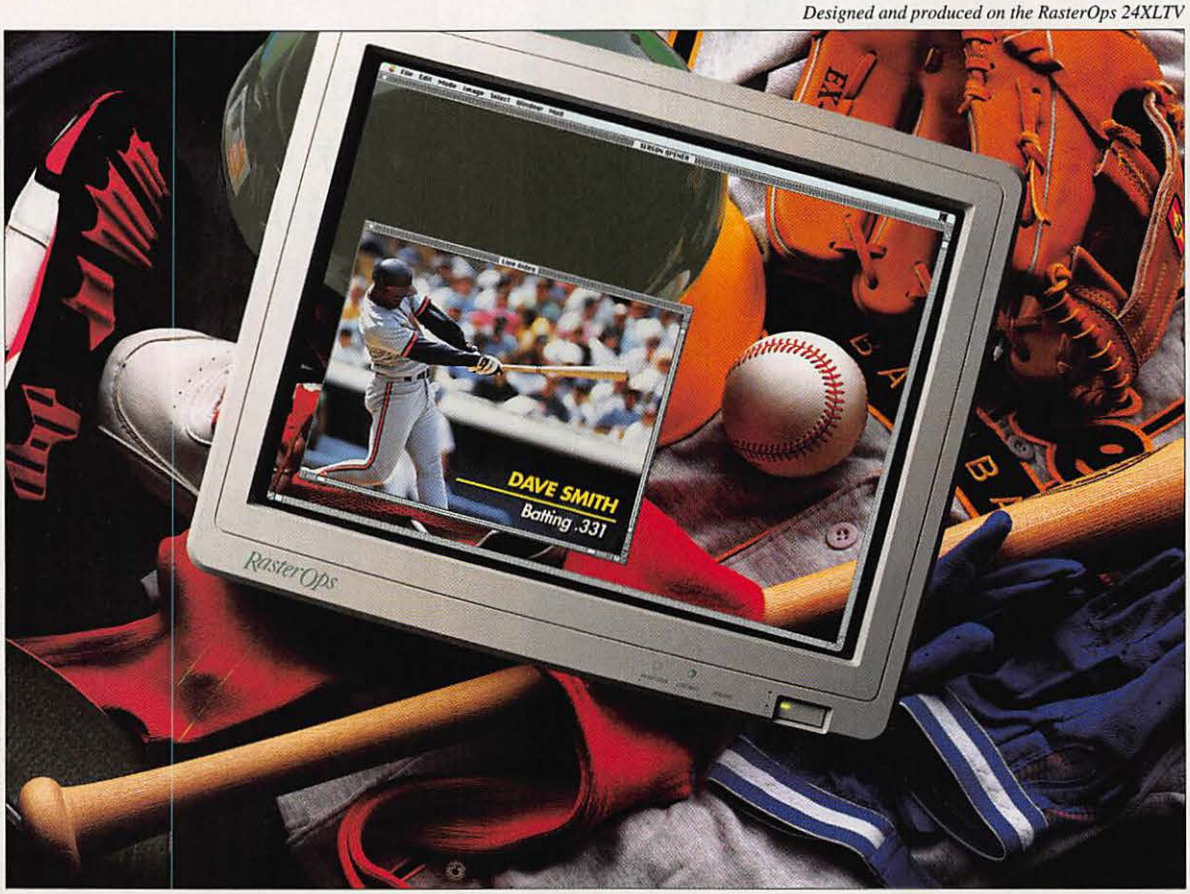
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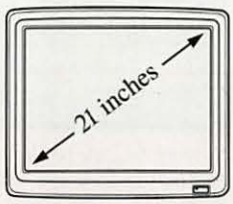
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LETTERS



WARD SCHUMAKER

Screaming Cartridges

Tom Negrino neglected to comment on an important human factor ["Expansion Made Easy," May 1991]. The removable-cartridge drives, especially the SyQuest ones, are loud. If someone is thinking of using one for general-purpose add-on storage, and expects to have it on a desk next to the Mac all the time, they ought to be warned.

I still remember savoring the silence of my 128K Macintosh before fans, before anyone had a hard drive. We've come a long way from that state of auditory grace. My SyQuest moves me from environmental purgatory into the outer circle of a howling, cacophonous hell. I love the little bugger for what it does when I need it, but I don't turn it on more often than is necessary.

Andy Watson
via Internet

Have SyQuest, Will Travel

You never answered the question "Better than hard drives?" on removable-cartridge hard drives. Let me answer with an enthusiastic yes! I originally acquired my SyQuest unit as an efficient backup alternative, and I quickly found it to be the ideal tool for me as an independent consultant. Most clients have a number of Macs, which I could quickly adapt to with my SyQuest.

I have had my drive for 18 months now and have yet to experience my first problem. One must be as gentle as possible at all times, using the protective case for travel. Maybe those who have had reliability problems look at the SyQuest as a floppy media product, and not as the mini-Winchester technology that it really is.

Paul Vilandre
Menlo Park, California

File Away Fonts

I had one problem with "Working with Fonts" [May 1991]. The writer neglects to remind the user not to remove the sizes of Geneva, Monaco, and Chicago not required for System operation. Even though you don't have Geneva 14 in the System file, the fact that some portion of the Geneva family exists in the System file means the other point sizes are ignored in any open suitcase files. While the author does say this includes the use of ATM and technically makes my point moot, users who are not running ATM might be confused by their results.

Mark Gerrior
Marlborough, Vermont

Trap Trips

Your recent article "Setting Traps" [May 1991] contains some misinformation about how traps work in QuarkXPress 3.0. QuarkXPress does allow you to set trapping parameters, but they do not ap-

(continues)

Corrections

*Luis Delgado should have been credited for the Hydra One photo (*Macworld News, *May 1991).*

*The correct telephone number for IS Robotics (*Where to Buy, *May 1991) is 818/597-1900.*

Freedom of Press PostScript-emulation software ("Personal Page Printers Arrive," May 1991) requires 2.5MB of disk space and is directly compatible with Type 1 fonts independent of Adobe Type Manager.

William E. Smith is the author of Bayshore Blast ("The Secrets of the SuperStacks," April 1991); Paul Baerman is the publisher.

*The telephone number for the Trace Research & Development Center is 608/262-6966 (*Conspicuous Consumer, *June 1991).*

TheErgonomiksGraphics Visor was incorrectly listed in New Products, *June 1991. The product has two patents pending. Ergonomiks can be reached at 602/839-8413.*

*Descartes (*Where to Buy, *June 1991) has been acquired by PC Globe (602/730-9000).*

The full-page picture on page 139 of the June 1991 issue ("Optical Outlook") is of the Pinnacle Micro REO-6500, a 6.5GB magneto-optical disk jukebox.

(continues)

*The correct telephone number for PMC Telesystems, maker of Rendezvous-Plus (*New Products, *June 1991), is 604/255-9949.*

*The correct telephone number for S.T.O.P., which offers the Tattoo registry service for Macs (*New Products, *June 1991), is 203/359-9361.*

*PictureBook (*News, *June 1991) has always been published by Loop Software, not by Symmetry.*

Adobe Photoshop is not included with the Epson ES-300C color scanner ("Affordable Color Scanning," June 1991).

The fill bucket of Easy Color Paint 2.0 ("The Electronic Palette," April 1991) can be configured to do gradients by using a menu option.

ply to every occurrence of a color, as intuition might lead one to believe. The manual describes a distinction between what it calls a background color—a color assigned as a background of a picture or text box—and an object color, a color that is assigned to text or rules.

When you specify a trap in QuarkXPress, you are specifying what happens only when an object of that color meets a background of another color.

Quark promises its upcoming version 3.1 will provide enhanced trapping flexibility. However, if it's anything like the 3.0 upgrade, it will be very late, very expensive, and offer no site licensing.

Jeff Jackson
Wayne, New Jersey

Trend Talking

Your recent "Laptop on My Mind" *Commentary* in the May issue was fun reading, and I'm glad you're helping get the word out on what cool products are available in Japan. The story about the Sony exec offering Apple the Data Discman in return for the Macintosh Operating System is not true: the Data Discman was developed as a skunkworks project by Sony's audio engineers and was not [part of] any deal-making with Apple. If you look closely, the Data Discman is not such a good computer.

Also, the Dynabook notebook computer that you mention is sold by Toshiba, not Panasonic. There are many other exciting computer products available in Japan now. It would be interesting to see more about those devices in future articles.

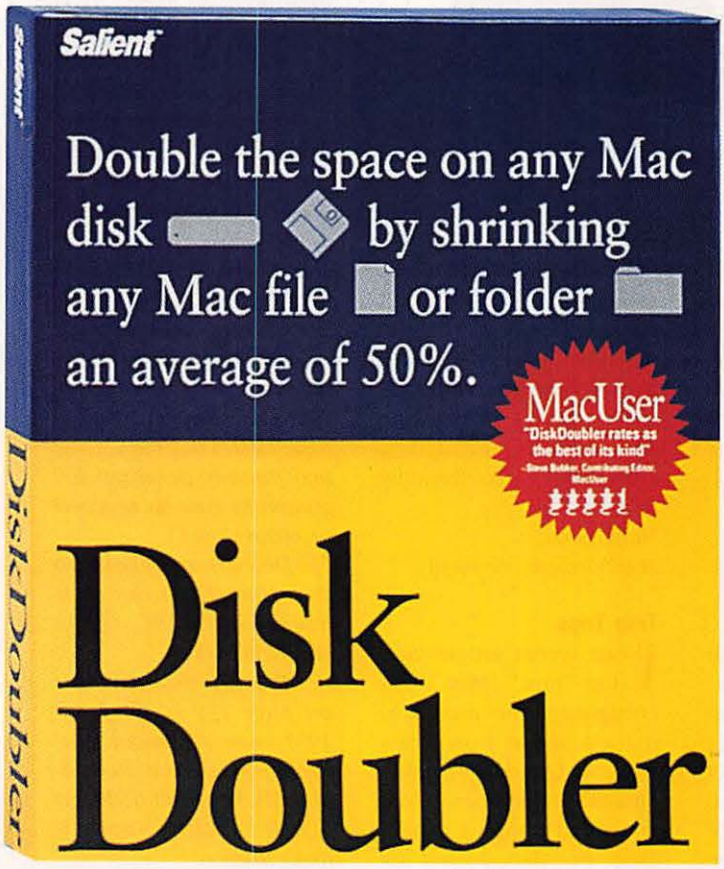
Richard Sprague
Philadelphia, Pennsylvania

Starving for Art's Software

As a student with a very tight budget, how do I enter the world of Macintosh art? What basic software would one need to do quality artistic work on the Mac? Do I need to get specific about the exact type of art? If so, I would choose 3-D art and animation.

Jeffrey Lawrence Weeden
Westminster, Colorado

See "Getting Started with 3-D Graphics" in this issue for an overview of 3-D graphics products and what they do. A user *(continues)*



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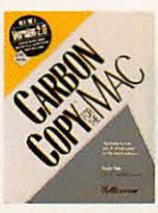
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group can give you specific advice based on your budget and what you want the software to do. Call 800/538-9696 ext. 500 to find a local user group.

Biology's Complexities

If Steven Levy had a better understanding of biology, I suspect he would be less inclined to take the predictions of artificial-life enthusiasts at face value, as he does in "Life in the Anthropomorphic Lane" [*The Iconoclast,* May 1991].

In order to be considered living, an artificial organism should at least be able to replicate without extensive human assistance. It's true that software viruses behave like biological viruses in this regard, but many biologists question whether molecular viruses should be considered alive. Viruses do not have the ability to reproduce by themselves. They depend on the highly sophisticated molecular systems of their hosts.

Artificial-life research is worthwhile, but, as with artificial-intelligence research, its main value may be to teach reductionist computer scientists the meaning of complexity.

Terry Hansen
Seattle, Washington

The AutoCAD Challenge

There's been a rumor floating around that AutoCAD for the Macintosh makes direct calls to the Mac video hardware and thus causes some compatibility problems ["Send In the Clones," April 1991]. To show how wrong this rumor is, the Mac AutoCAD programmers have taken up a collection, and we will pay $2000 to the first person who proves that Mac AutoCAD directly manipulates Macintosh video hardware.

We consider proof to be a repeatable sequence of actions, using an out-of-the-box copy of the U.S. version of release 10 Macintosh AutoCAD, that results in some normal display activity and that any usual Mac debugger shows to be done through AutoCAD's directly manipulating video hardware, rather than through a QuickDraw, Toolbox, or OS call.

Anyone wanting more information should contact me at 415/332-2344 or at Autodesk, 2320 Marinship Way, Sausalito, CA 94965. This is a personal challenge and is not authorized or approved by Autodesk.

Robert Murphy
Senior Software Engineer
Autodesk
Sausalito, California

Apples and Lemons

After reading your article on NuTek ["Send In the Clones," April 1991], I could not stand it any longer. We techs have preferences when working on computers, and clones of any kind are not included. I have found, after working on many an IBM-compatible machine, that these machines are inferior in quality and workmanship. If NuTek thinks it can get a product that will perform like a Mac, it is dreaming. I'll probably see more of them in the shop for hardware problems



than any Mac. I have nothing to gain by this, but I hope Apple sues the hell out of NuTek. A lemon is not as sweet as an Apple.
Charles Michaels
Miami, Florida

Seeing Is Believing

The cover story on Mac clones seems totally taken in by a remarkable PR job by NuTek. Right now there is no NuTek clone. NuTek has not made the claim of a functional system, just that such a system is under development. The prediction of "a Mac-compatible with a color monitor, hard drive, and 68030 processor for just over $600" would be extremely hard to justify, given that the cost of just those three items today runs well over $600, ignoring the license fee, support chips, research and development costs, case, keyboard, mouse, video controller, power supply, and so on, and of course a few bucks of profit for the manufacturer.
Bill Stewart-Cole
via CompuServe

The $100 Subscription

Are you discriminating against overseas subscribers? As I sit down to consider renewing my subscription, I see to my horror from the small print of the subscription information that you have abandoned your surface-mail options for overseas subscribers. Our postage rate has gone up from $16 to $69! This in effect triples the subscription price for overseas readers, who now have to pay one dollar short of $100 for one year of *Macworld*—a markup of 230 percent over the domestic rate. Could you not bring back the domestic rate? Speed is not always of the essence; *Macworld* is not, after all, an ephemeral publication to be dragged to the Trash can after a quick once-over.
Sylvia Yates
Dublin, Ireland

The majority of our overseas subscribers want to receive *Macworld* on a more timely basis and at a rate lower than the former airmail rate of $95 per year, so we contracted with a foreign carrier who offered low rates based on servicing all foreign subscriptions. The cost per issue is $5.75 versus the $8.95 it costs to mail a copy by air individually.

Home User Attention

You have forgotten your roots. You, like Apple, have left the home user behind. I find almost no articles or product reviews for the home user. Apple is coming around; I hope you also remember those who got you started.
Mark Thompson
via CompuServe

. . . . . .

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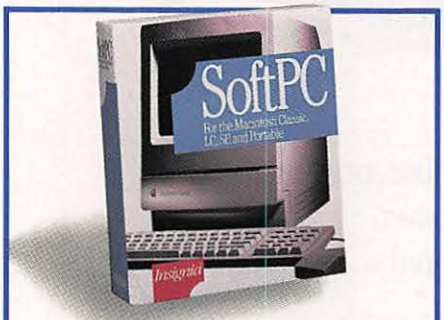
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8937 ❼MacSpin 3.01 ..... 169.
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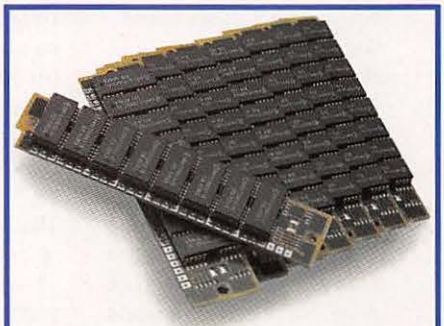
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5683 ❼Nisus 3.06 ..... 245.

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7697 ❼Letter Writer Plus 1.01 ..... 52.
7694 ❼Address Book Plus 2.0 *(June '91)* 57.
7698 ❼Fast Forms 2.0 ..... 104.

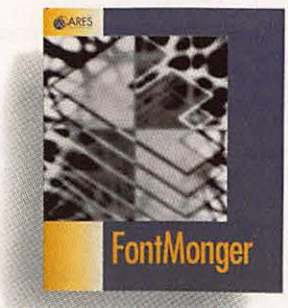
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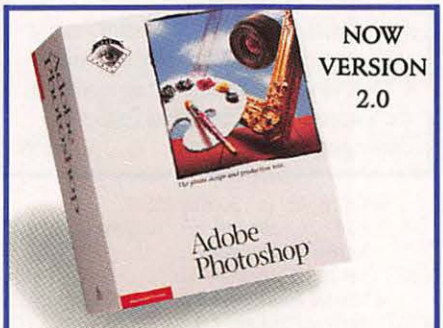
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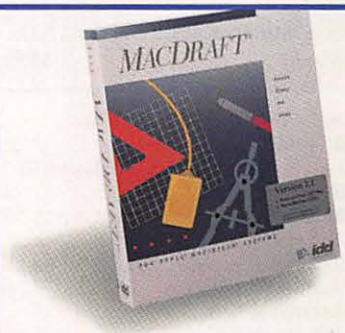
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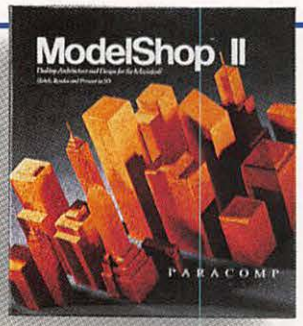
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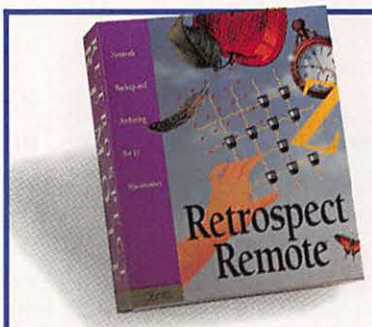
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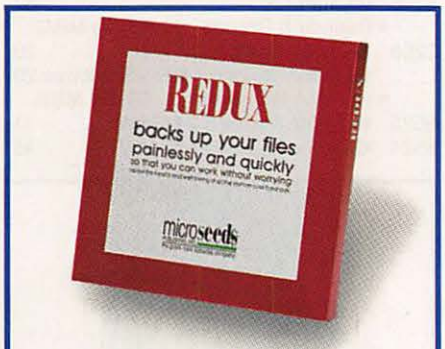
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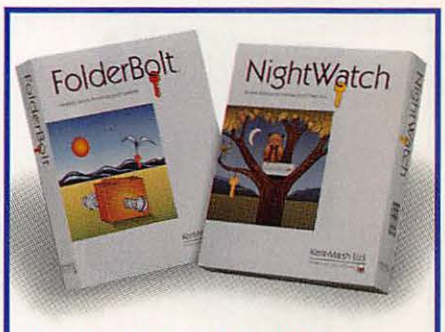
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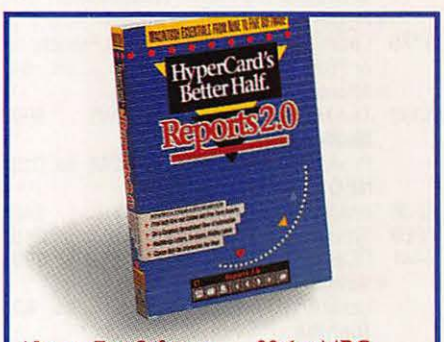
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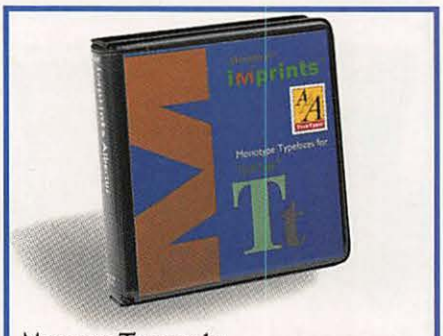
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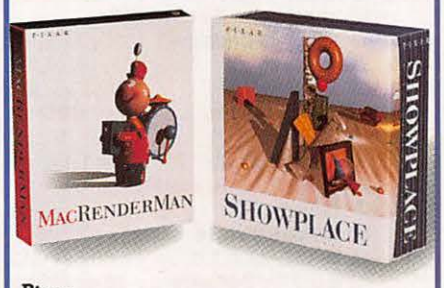
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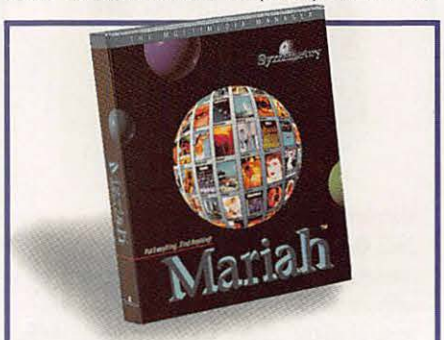
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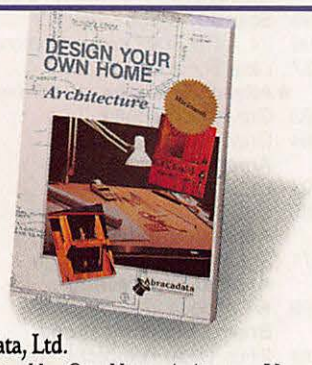
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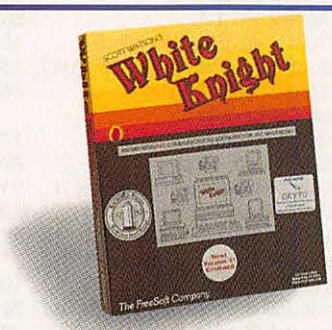
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6917 NetModem V.32 *(V.42 & V.42 bis)*. 1169.
6519 ❼EtherGate 1.50.1 ..... 1299.
8189 FastPath IV ..... 1889.

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3720 TOPS Flashcard ..... 155.
6264 ❼TOPS Network 3.1 *(August '91)* . 187.

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1179 V.42bis Modem *(w/MacPack)* . . . . 169.

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Shoshanah Dubiner
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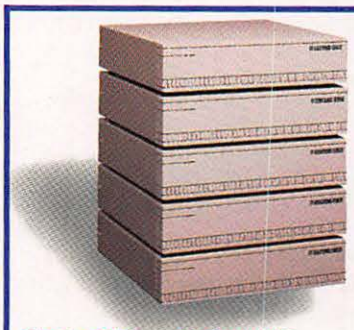
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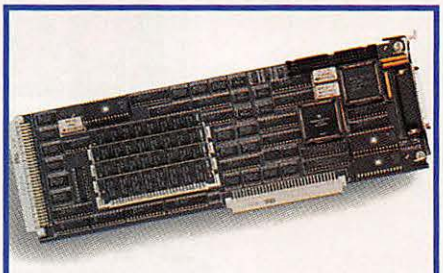
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9955 SCSI PowerCard *(4 Mb Installed)*. 1295.
25 MHz PowerCard 030 *(II,IIx,IIcx) ea.* 1095.
40 MHz PowerCard 030 *(II,IIx,IIcx) ea.* 1389.
50 MHz PowerCard 030 *(II,IIx,IIcx) ea.* 1895.

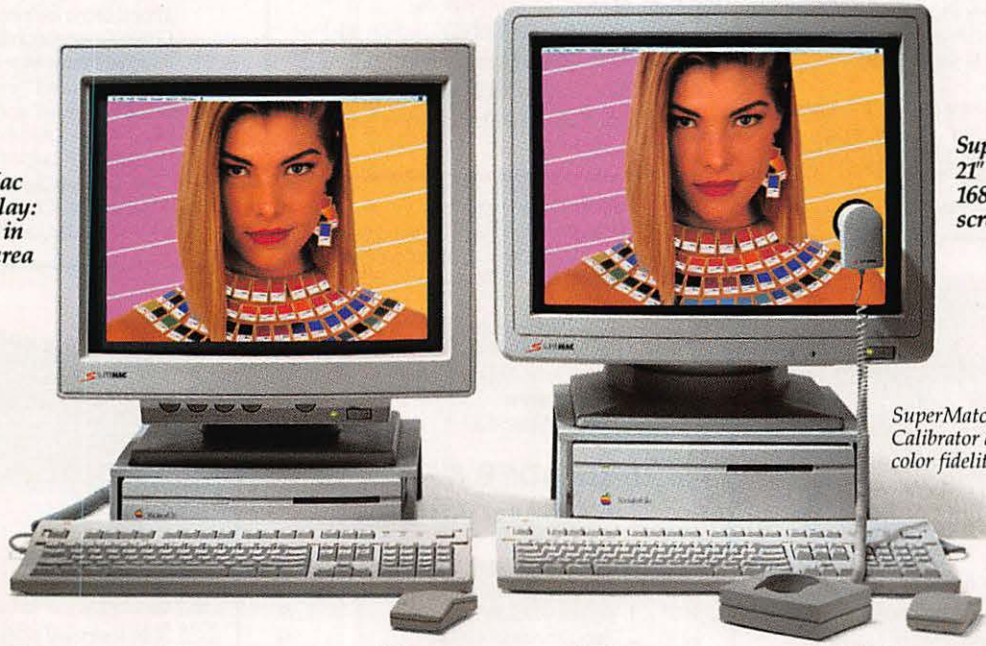


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New Low-Cost Macs



New Low-Cost SuperMacs

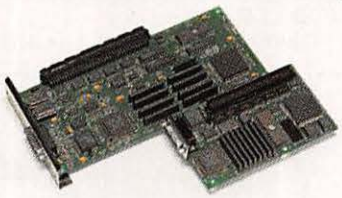
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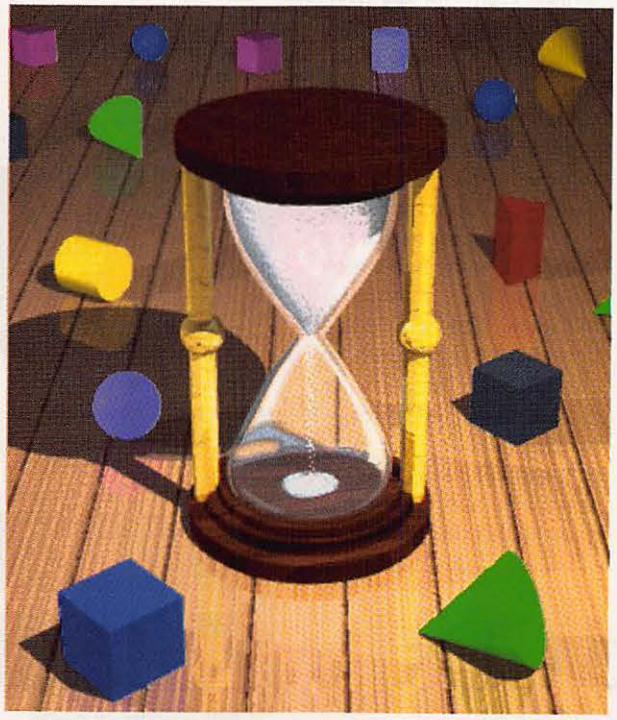
Circle 88 on reader service card

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ART BEAT

by Cathy Abes

The tools and the talent behind Macworld's graphics and the techniques that make them possible



The final illustration for "Getting Started with 3-D Graphics."

Artist: Free-lance illustrator Scott Baldwin has been creating three-dimensional graphics on the Mac for nearly a year, and recently began experimenting with Infini-D, a newly released modeling, rendering, and animation package from Specular International. "There are new frontiers I'm exploring now, that products like Infini-D are bringing to the desktop," he says. "The combination of high-powered modeling/rendering programs and a desktop computer is a new medium." Baldwin loves Infini-D's infinite variety of colors and realistic surfaces and the editing controls it provides for lighting, surface mapping, and other attributes. But he has found that the process of redrawing, even in wireframe mode, is very slow, especially if the drawing is complex, and ray tracing one of his illustrations typically takes 12 to 15 hours. He expects to overcome this obstacle by getting an 040 accelerator for his Mac.

Hardware: Mac IIcx with 8MB of RAM and a Cirrus 105MB internal hard drive; 13-inch Apple color monitor; SuperMac ColorCard/24; Jasmine Removable 45 (SyQuest) drive; Kurta 12-by-12-inch graphics tablet; Apple Personal LaserWriter NT.

Software: Infini-D, Adobe Photoshop.

How It Was Done: For the illustration that opens this month's *Getting Started* column, Baldwin began by selecting the lathe (doughnut-shaped) tool and clicking in one of the View windows to create the wooden disk on the top of the hourglass. In addition to the world views that 3-D programs typically provide, Infini-D offers a Workshop window in which you construct objects; the tool selections available in the Workshop change, depending on whether you're creating a lathed, extruded, or free-form object. After working on the wooden disk in the Lathe Workshop, Baldwin made the bottom disk by duplicating the top one, option-dragging the copy, and flipping it over.

To specify a surface map for the disks, Baldwin selected New from the Surface Floater (an interactive floating window that allows you to edit and apply surface attributes to objects). In the resulting Surface Information dialog box, he chose a wood map and altered its properties: 100 percent diffuse shading, 75 percent specular highlight, 75 percent shininess. Then he adjusted the three sliders for Swirl, Grain, and Cut to add some swirl to the wood grain. Next he chose two colors to gradate the wood grain from a medium to a light brown.

The hourglass, another lathed object, was created in a similar manner, except that the glass was hollow rather than solid like the wood. After positioning the hourglass between the two wooden disks in the View windows, Baldwin selected the glass surface from the pull-down menu of surface types in the Surface Floater. He kept the glass surface's default settings for transparency and reflectiveness, and added a small percentage of glow so that the glass would show up better against the wood floor background.

Next, Baldwin created the sand in the top compartment of the hourglass. First he duplicated the hourglass and edited it in the Lathe Workshop, where he eliminated the bottom half and outside edge of the glass. The contour of the top half of the hourglass provided a solid form for the sand. Because the sand shape and the hourglass both had the same center point, Baldwin was able to easily position the sand exactly inside the hourglass in the View window.

To create the texture for the sand, Baldwin accessed the Surface Floater, and in the Surface Information box selected Flat

(continues)

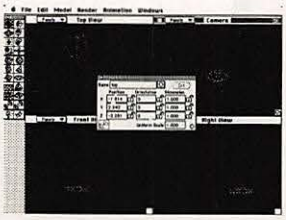
Color and chose a light grayish beige. To give the sand a granular look, he specified a bump map of 100 percent. The small pile of sand on the bottom is another lathed object with the same texture attributes.

The two polished gold columns were created from one extruded shape, an octagon with a sphere embedded in the middle (the finished object was then duplicated to create the second column). For the columns' surface Baldwin chose gold, and for the color, light yellow. The surface properties included 92 percent diffuse shading, 100 percent specular highlight, 79 percent shininess, 62 percent metallicity, and 44 percent reflectiveness.

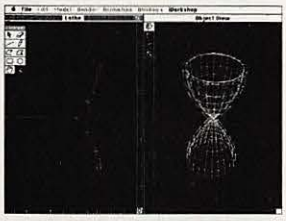
For the floor, Baldwin selected the 2D Square tool and then used the Squash and Stretch tools to stretch the square into a long, narrow plank. After adding the wood texture, he duplicated the plank enough times to make the floor. In order to get the type of wood grain he wanted, Baldwin needed to create a custom surface composition. A window in the Compose Surface dialog box displays a simple three-dimensional version of whatever you're working on; on top of the image is a square marquee into which you paste the surface to be mapped. Baldwin compressed the wood grain by changing the size and the shape of the marquee—making it long and narrow—to change the wood grain from short and wide to long and thin. Then he gave the wood map 100 percent reflectiveness.

The geometric objects, known as generic primitives, were created with the Sphere, Cube, Cone, and Cylinder tools. For their surfaces, Baldwin selected red plastic and then changed the color for each object. Then he selected, edited, and positioned two lights—a medium gray point light at the middle left side of the scene and a pale yellow spotlight at the upper right front.

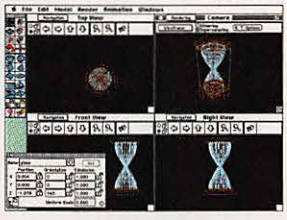
After ray tracing the image and saving it as a PICT file, he imported it into Photoshop to adjust the hourglass and the sand. He made the bottom compartment of the hourglass transparent by copying part of the floor, moving it on top of the glass, and adjusting the brightness—lightening the wood to make it look as if it's showing through the glass. Finally, he added the stream of sand dropping through the hourglass. M



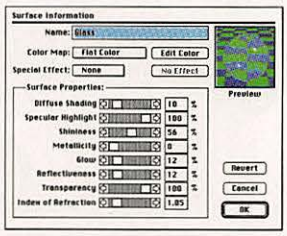
The four-window view of the edited wooden disk for the top of the hourglass. In the middle is the Object Floater window, which was used to position the disk.



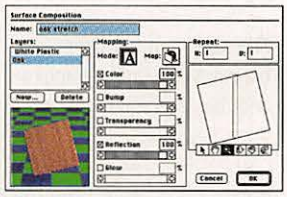
The hourglass's object and cross-section views after it was constructed in Infini-D's Lathe Workshop.



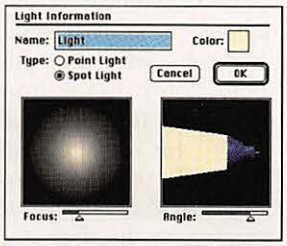
The artist positioned the wooden disks above and below the hourglass, again by using the Object Floater.



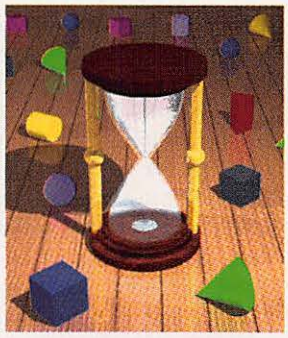
Baldwin specified surface properties for the hourglass in the Surface Information box.



In the Surface Composition box, Baldwin stretched the wood surface for the floor to give it a long, thin grain pattern.



The artist set lighting attributes in the Light Information box.



The final Infini-D image before it was edited in Photoshop.

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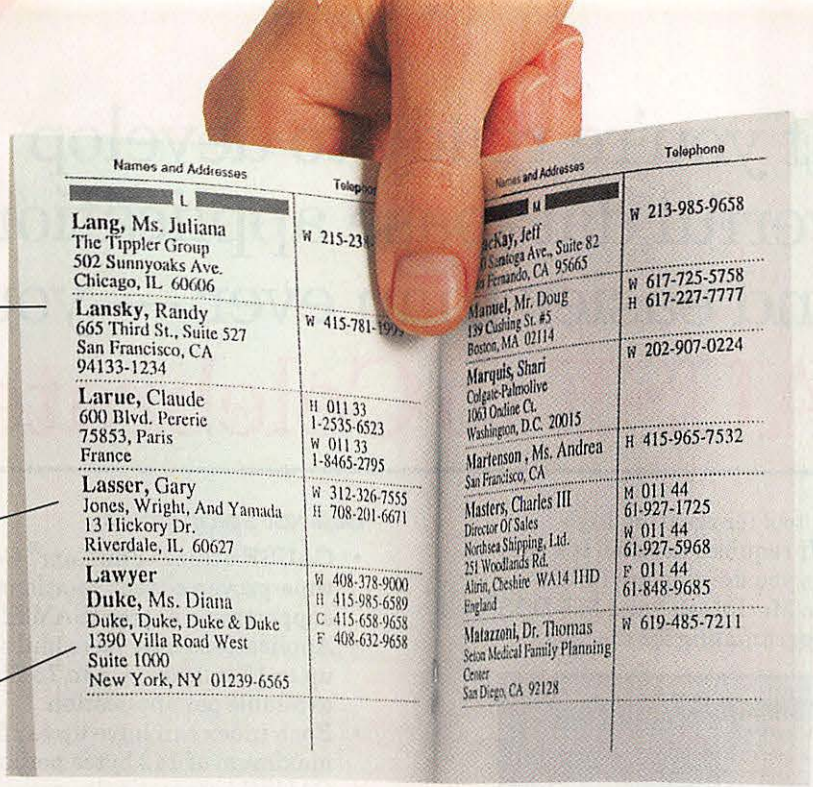
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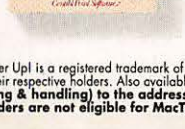
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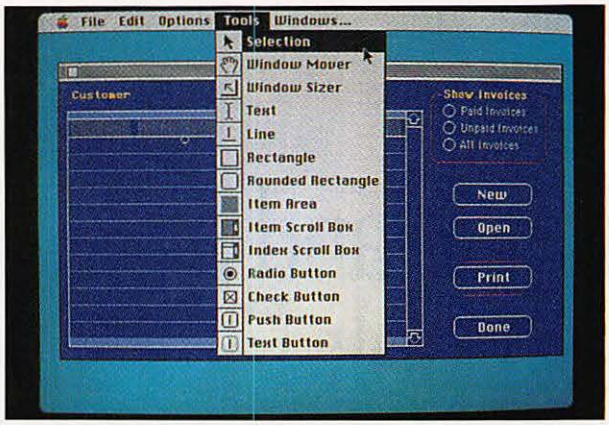
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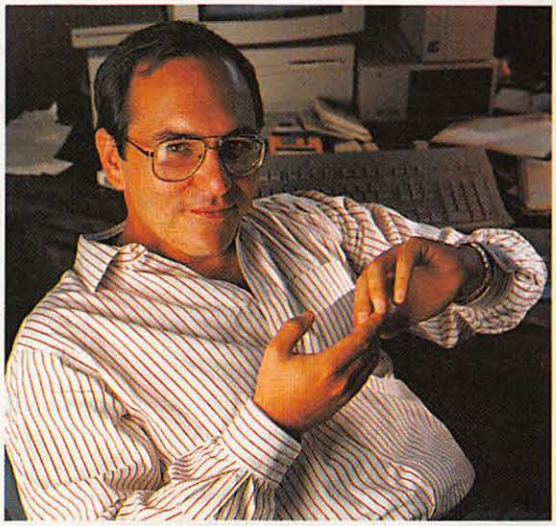


The New Frontier

Is Dave Winer's latest product a kick, or the beginning of the end?

BY STEVEN LEVY

In a subculture crammed with two-bit gurus and pointy-headed visionaries, UserLand Software president Dave Winer has indisputable bona fides. Out of the ashes of Personal Software, the legendary company that came out with the first electronic spreadsheet, VisiCalc, Winer delivered full-blown the concept of an outline processor—an essential tool that had not existed before. After beginning on the Apple II, he zeroed in on the Macintosh as his showcase platform and garnered glory with the outline product, which he named ThinkTank and released in the Mac's premier year of 1984. As an encore, Winer and his design team concocted More, a bulked-up outlining program that became number one with a bullet chart. His next trick was a well-timed cash out, as he sold the company he built, Living Videotext, to Symantec. In 1988 Winer walked away with millions of dollars and plenty of time to outline his next move.



ROBERT HOLMGREN

Developer Dave Winer: a wirehead's best friend?

For a couple of years word had it that Dave Winer was working on something big, something to do with making applications work together. Eventually Winer showed me an early version of his product. It is called Frontier, a name that implies a new era in computing. And perhaps the software does mark a new era in Macintosh computing. But after playing with the product, seeing a couple of demonstrations, and squaring its potential with the platform on which it rests—Apple's long-awaited System 7—my socks are still in place because there's something about Frontier that only a wirehead could love.

I think it's important to explain just why Frontier doesn't make my innards tingle. Winer's new software strikes me as symptomatic of something many of us have long feared, and is finally here: the Macintosh's boring middle age.

IAC Explained

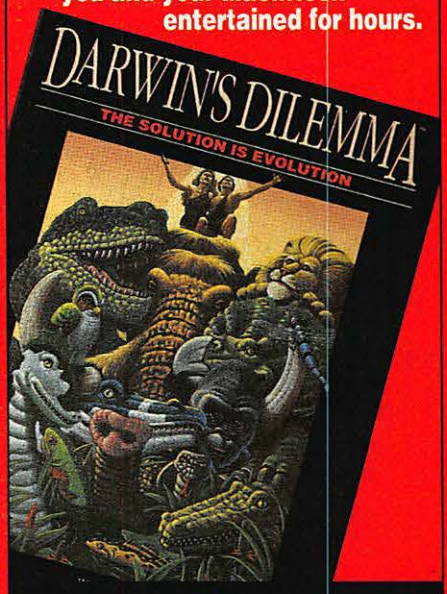
In order to understand Frontier (which I'll admit is impressive and could be significant in boosting productivity), you must understand something called IAC. The kind of people who have mastered this subject make poor companions during elevator failures; for the benefit of everyone else, I should explain that IAC means interapplication communications. This is a new, System 7–based protocol by which Macintosh programs can access other programs. Presumably, as software developers rewrite their applications to accommodate IAC, a word processor will be able to swap all sorts of information with a communications program and then send it to a page-layout program in the stroke of a key.

This information is not limited to data. No, with IAC, developers will install into their programs something called AppleEvents, which allows applications to fire off commands to one another. Picture, say, your word processor having protruding "wires" that can link to similar wires in your communications program. As Pam Deziel,

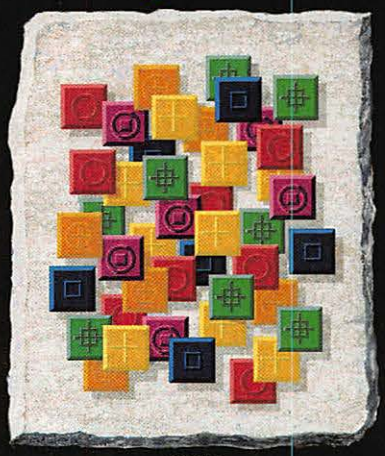
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Apple's IAC product manager (yes, there is such a person), explains, "A generation ago the fundamental advance was copy and paste, but that was limited to data, and you had to quit the application to use it. This is the next generation."

But there's a catch. As it now stands, to take advantage of these wires and connections, another piece is required. You need to write scripts to connect the wires to each other.

Party Animal

When Dave Winer first heard of the IAC protocol in 1988, he assumed that Apple itself was going to provide this tool, especially when he heard former official Jean-Louis Gassée talk about how important user-scripting was going to be. But later that year Winer discovered over breakfast with Gassée that Apple had nothing going in that department. (Since then, Apple has announced Open Scripting Architecture, a set of standards for IAC that will also form the basis for AppleScript, an upcoming user programming language. Frontier will support the architecture.) So Winer asked if he could try it himself, and a few months later he unveiled a prototype to some of Apple's technobrain trust. He hoped Apple would license the system not only because it would save him the trouble of marketing it, but also because the product stood a better chance of acceptance with Apple's muscle behind it. After all, it was Apple's operating system that Frontier depended on.

But Apple passed on the opportunity (Apple won't officially comment on why), so Dave Winer decided to do it and founded UserLand. "I've been in the software business longer than anybody," he explains, momentarily forgetting Bill Gates. "If I don't do it, who the hell is going to do it? Also, I'm already cashed out—I did very well [selling to] Symantec. Even if Apple comes out fast and beats me—and they can't, they don't have anyone working on this—I'm not going to lose my nest egg," he says.

"Anyway, I asked myself, why did I make the money in the first place, if not to do what I wanted? It's transcendental money. UserLand Software is a good party."

Exploring Frontier

So let's check out the guest of honor. As you might expect from a Dave Winer product, Frontier is based on the outline form. You write scripts by using nifty outline-ish hierarchies, and you can also instantly stick commands on the menu bar by simply typing them in (this is a very neat trick, and fun to play with).

The scripts do not necessarily have to link applications together. One of the most powerful things they do is work within the Finder to perform the sort of jobs known to those in the DOS world as batch processing. These are the kind of tasks easy to do on Compaq and Tandy machines, and frustrating on the Mac. (Examples include "delete all temporary files" and "open all files that I've worked on since Tuesday.")

Winer's software is symptomatic of the Mac's boring middle age

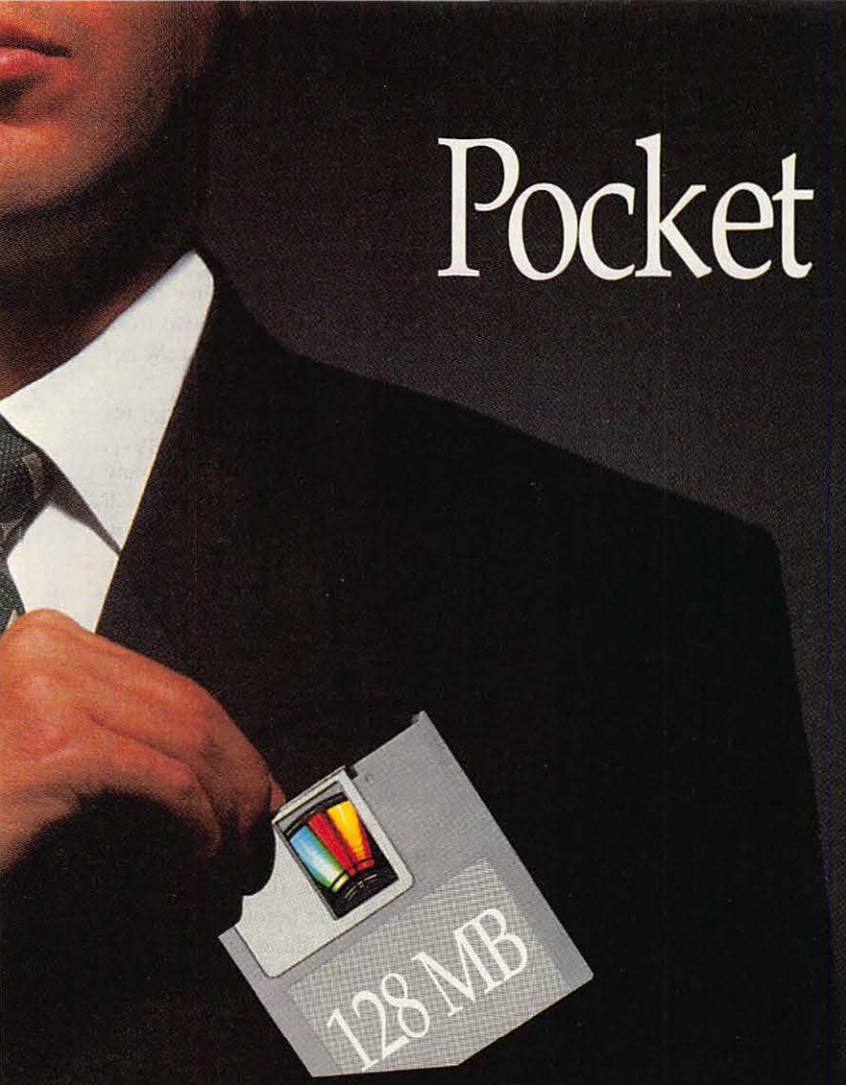
From there, you can give Frontier more-complicated requests. For instance, a program like AppleLink that has no built-in scripting capability can be automated to open up, log on, and download files, send them to a word processor, reformat them, and print them.

Provided that software developers create the hooks to integrate IAC tools seamlessly into their own applications, all your applications will work with each other. Software developers will no longer be encumbered by the need to provide everything in the same package. They can simply assume that if you need word processing power or drawing capability, you'll hook up to a program that can already do it well.

This all sounds wonderful in theory. With Frontier anyone can script connections between all applications that support IAC—and UserLand (along with Apple) is encouraging developers to take that step. But the vast majority of Macintosh users, even those who could benefit from Frontier's power, cannot use the

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product to full advantage.

Why not? Because you need to master a programming language in order to write scripts. As programming languages go, Frontier's is a fairly easy one, with a syntax relatively free of wiggly-line brackets. And Winer's design team has done a masterful job of using the outline paradigm to make the script writing as painless as possible. But it *is* a programming language, one that is harder than HyperTalk in my opinion, and therein lies the rub. Only wireheads can use it.

There are supposed to be ways around this for just plain users. Winer talks about a run-time version of the product that could run prewritten scripts, with no programming required. With the proper scripts included, he thinks, Frontier could be a SideKick of the nineties. Another possibility is that some other developer will devise an easy-to-use front end for the product, something Winer says is also in the works.

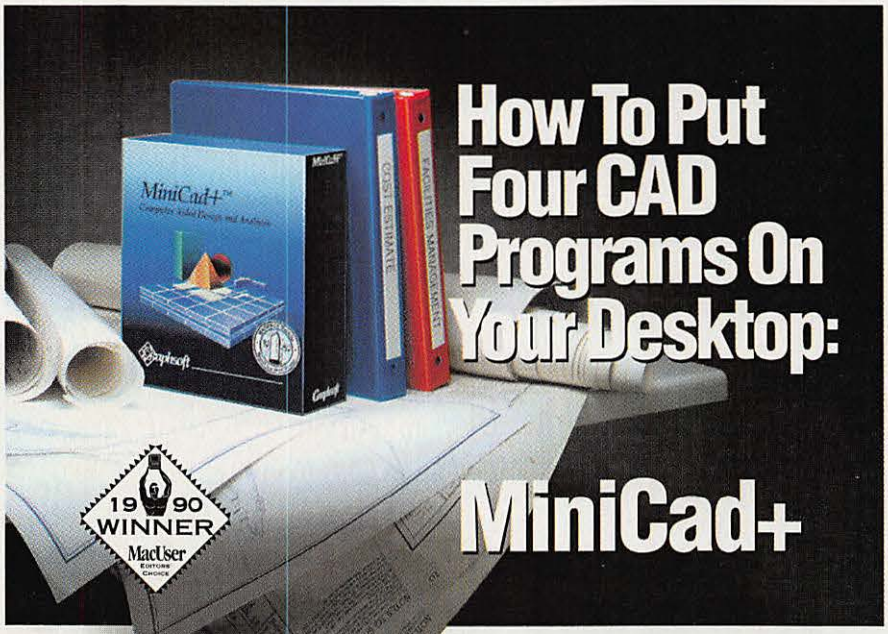
I've spoken to two companies who have implemented simpler, though less encompassing, scripting on the Mac, and both of them—CE Software with its QuicKeys, and Affinity Microsystems with its Tempo II—say that they will unveil new programs that take advantage of IAC. So I have no doubts that one day in the near future, say before the millennium, a near-bozo like me will be able to link my communications program to my word processor, thus being IAC-literate (admittedly something I never aspired to in college).

But that's later. Right now, Dave Winer's landmark product requires you to hack code before you get the goodies. After mulling this over with Winer for a while, I finally burst out with a plea for the rest of us: "Isn't the idea to make things *easier* for users?" I asked.

Winer had an answer for this, maybe a good one: "You're taking me to task for something I never said I'd do!" he howled, emphasizing that the product isn't really designed at this point for so-called end users, but for ultrapower users. The kind of users who once got their kicks out of writing stuff in dBase code. "I wrote this for people like me," says Winer, an admitted wirehead, who claims that people like him will gobble up Frontier's features like a big bag of potato chips.

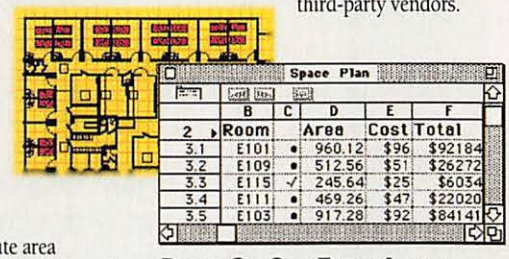
Fair enough. Maybe my complaint really isn't with Frontier, then, but with the new world order whereby System 7 and its kin will supposedly change our lives. It's been almost eight years since the introduction of the Mac, and that time has been dotted with blazing innovations, new ideas that have increased productivity while enhancing creativity—great programs like PageMaker and even ThinkTank and More. But now it seems that all the big applications breakthroughs have been made. Hoping to create another VisiCalc or

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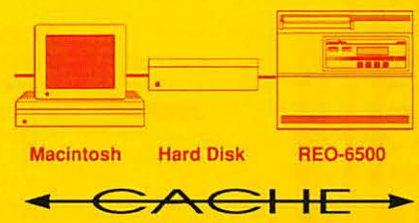
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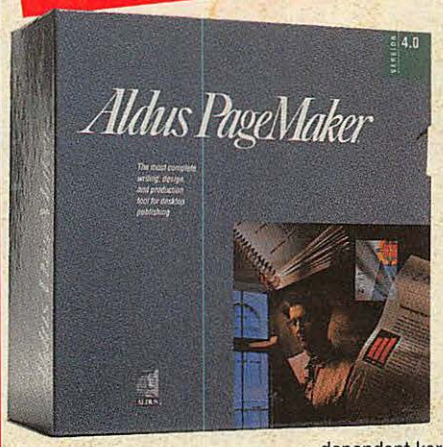
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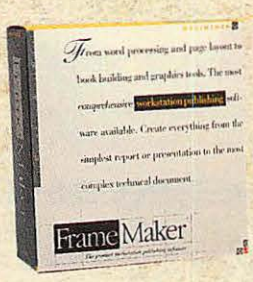
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FrameMaker is the first software application that lets you simply and elegantly create long, structured, multi-author documents on a Macintosh, without switching back and forth between other word processing and page layout programs. FrameMaker seamlessly integrates word processing, page layout, graphics, math equations and book building functions in one application. This is real workstation publishing software.

#03582 FrameMaker ...$795

Brøderbund The Print Shop

$34

The Print Shop makes it amazingly easy to create eye-catching stationery, greeting cards, letterheads, flyers, banners and other personalized communications. The program includes a wide variety of type styles, borders, background patterns, pictures and symbols. You can even pick up graphics that were created in MacPaint and transport them to your Print Shop designs.

#01015 Print Shop $34



Desktop Publishing

Aldus Corp.
03880 Personal Press 1.0 198
03461 Aldus Pre Print 328
03223 Aldus PageMaker 4.0 498

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03984 Taste 83

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03488 XPress 3.0 518

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03798 Publish It! Easy 2.0 143

Ventura Software - Xerox
03909 Ventura Publisher 498

Smack-A-Mac Happy Face! Dust Covers

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Top your Mac with a smile! Happy Face covers are fun and functional. Made from tough machine-washable fabric, each comes with a laugh-filled keyboard cover. Fits MacPlus, Classic, SE and SE/30.

#03754 Happy Face! $17
#03756 Mac IIsi, LC or 13" Monitor Cover $18



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Adobe Type-On-Call

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Type On Call offers over 800 Adobe Type 1 fonts on a single CD-ROM in a new accessible format. Simply by purchasing access codes over the phone, type users can obtain new fonts from the disk. Type On Call is the quickest and easiest way to buy fonts – once you have the disc, every font is a simple phone call away!

#03950 Type-On-Call $47

Top 20 Fonts and Clip Art

Adobe Systems
3210 Type Set 1 64
3211 Type Set 2 64
3491 Type Set 3 115
2331 6 Optima 124
02334 9 ITC Garamond 124
02336 11 ITC Benguait&Fritz Qua 124
02338 13 Helv Lt & Helv Black 124
02339 14 Helv Condensed 238
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01015 Print Shop 34
03132 TypeStyler 1.5 114

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02200 MacDraw II 284

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00937 Cricket Draw 149

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03135 Canvas 3.0 199

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03761 Dyna Perspective 2.0 599

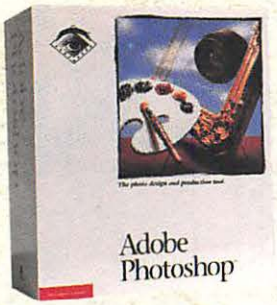
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02015 Dreams 318

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03216 ColorStudio 598
03217 DesignStudio 488
01925 ImageStudio 138
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02237 Multiclip 2.0 68

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03435 Pantone Color Book 48

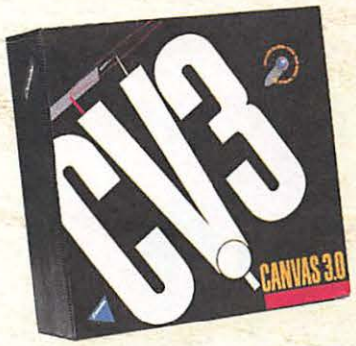
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03946 Draw Tools 58



Adobe PhotoShop $499

Photoshop 2.0 gives you direct access to a broader spectrum of color editing and production capabilities than many high-end pre-press systems. Now you can easily view and edit your high-resolution CMYK color scans right on-screen without converting to the RGB of your monitor just as you would with an expensive system..

#03139 Photoshop 2.0 ....$499



Canvas 3.0 $299

This new version delivers more than one hundred new features including significantly enhanced text handling, object blending, Bézier font outlines, and full support for Deneba's revolutionary Open Architecture technology.

#00803 Canvas 3.0 .....$299

MultiMedia

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00053 Multi-Ad Creator 455

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03895 Video Paint 278

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03993 Picture Press 1.03 120



Macromind Director 3.0 $628

MacroMind Director 3.0 is the multimedia presentation and animation tool that helps you communicate with greater impact . In version 3.0 Director is faster and easier for users to get the professional results they want. Movies and presentations sound , look and play better..

#02583 Director 3.0....$628

Scanners and Tablets

Abaton Technology Corp.
02916 Scanner 300/Gs 495

Animas
00149 True Color Hand Scanner 575

Dest
03929 Scanner W/Recognize 685

Logitech
02561 ScanMan Mdl 32 with Read-It 298

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03012 Cordless 4 Button Cursor 64
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03010 12X12 Tablet W/Pen & Cur 384
03011 12X17 Tablet W/Pen & Cur 624

Wacom
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03943 SP-310 Stylus (Soft) 99
03803 SD-311L 12X17 Elec Stat 1,325
00087 12X12 Static Sur 421 E 935
03801 SD-422L 12 X 12 Tablet 875



Microtek 1850 Slide Scan $2299

Microtek's ScanMaker 1850S is a revolutionary new 35mm slide scanner that's perfect for desktop publishing, presentation graphics and multimedia applications. You can scan 24-bit color and 256 shades of gray at up to 1850 dpi resolution. It's versatile enough to scan slides in portrait and landscape modes.

#0370 ScanMaker 1850S.....$2299

Microtek ScanMaker 600 ZS $1599

Introducing the ScanMaker 600ZS. Now you can scan 24-bit color, 256 shades of gray and B&W. It captures images with up to 600 dpi resolution. It boasts outstanding color image quality and features a new, compact flatbed design.

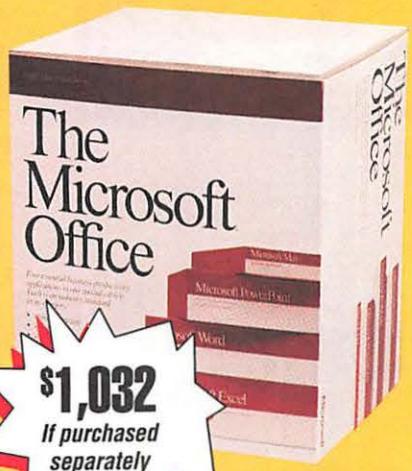
#00369 ScanMaker 600ZS .$1599



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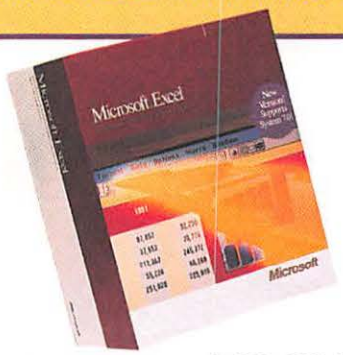
Microsoft Office $519



$1,032 If purchased separately

Four essential business-productivity applications in one special edition: Microsoft Word, Excel, PowerPoint and Mail. Each is an industry standard in its category, whether it is word processing, spreadsheets, desktop presentations, or electronic mail. Used together, they maximize productivity for your entire office.

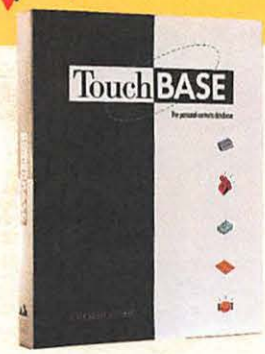
#02678 Office $519



Microsoft Excel 3.0 $308

Microsoft Excel is the most advanced spreadsheet for the Mac. It combines a spreadsheet with business graphics and data management. It contains presentation tools such as multiple fonts, variable row heights, shading, custom number formats, 68 built-in chart types and more.

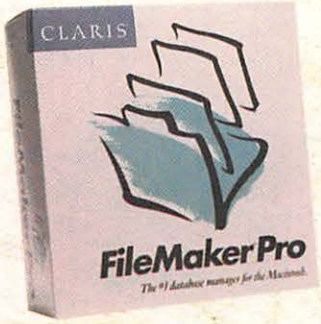
#00227 Excel 3.0 .....$308



TouchBASE $88

TouchBASE is a database to keep track of all personal and business contacts. It's handy all the time because it is a desk accessory. It can print envelopes, labels, address books, fax cover sheets and reports.

#03908 TouchBASE $88



Claris Filemaker Pro $214

FileMaker Pro is the best selling flat file database for the Mac. New graphics tools streamline the generation of reports and layouts. You'll appreciate the new data entry aids: check boxes, radio buttons and pop-up menus.

#03478 FileMaker Pro ...$214

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03103 Resume Expert 47
03243 Resume Xprt - Cover Letters 47

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02847 DocuComp 88

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02163 Foxbase+/Mac Runtime 2.0 174
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03613 Planisoft Five User 574
03612 Planisoft Single User 138

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02224 Wingz 1.1A 234

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The uses for LabelWriter are endless: you can print address labels, videocassette labels, di... or file labels. The palm size LabelWriter puts anything you can create with your Mac onto a 1" x 3-1/2" label. Our exclusive print driver software lets you print directly from your database, wo... processor or any other ap... ...n vertical or horizontal forma...

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01875 Ultimate Payroll 4.5 188
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02596 Accounts Receivable 519
02804 General Payroll 519
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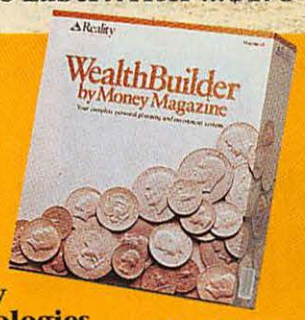
Reality Technologies
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01582 Macmoney 3.5 58

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03986 Accountant Inc. 2.0 338

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03464 Dollars And Cents 5.0 Sense 62

Teleware Incorporated
03535 M.Y.O.B. V.2.0 141



Reality Technologies WealthBuilder

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Calculate your net worth by using templates to create a personal profile balance sheet and budget summary. If you use *Quicken, Andrew Tobias, Manage your Money* or *MacMoney* you can import data directly. Establish realistic financial goals, objectives and then take action.

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02424 Persuasion 2.0 328

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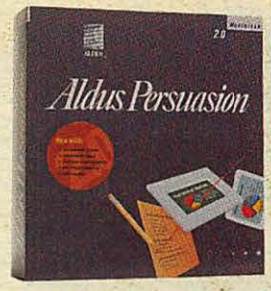
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03628 Atlas * MapMaker 4.5 368

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02007 More 3.0 264

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03373 FlexiGraphs 1.1 120
01357 FlexiTrace 145
03987 FlexiTrace/FlexiGraph Bundle 225



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$328

Let Aldus Persuasion 2.0 do all the work of developing presentation graphics. Select one of the predefined templates (or create your own), and type your ideas into the outliner. Persuasion automatically prepares your slides from the outline. You can use the slide show mode for your presentation or for a self-running demoor create overhead foils

#02424 Persuasion $328

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$314

Meeting Maker makes it easy to get the right people in the right place at the right time. Select meeting participants, as well, as rooms, equipment and resources from a list of user names. Schedules your work activities in advance, with Meeting Maker's easy-to-use calendar system. Prioritize and sort your activities with the built-in To-Do List.

#04009 Meeting Maker $314



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Software Ventures Microphone II 3.0

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Microphone II has earned high praise for its ease-of-use. Its scripting language makes using electronic mail services an automatic operation. Microphone II now supports the hot new ZMODEM transfer protocol and can operate modems at any speed from 50 to 57,600 baud. Microphone II sports improvements in the script language and offers more ways to execute scripts. For work with systems in foreign countries it supports character substitution in seven languages under ISO-7 standards, plus user-defined character sets. It also supports large screen monitors and color including color icons and offers VT102 and BT52 emulation.

#01902 Microphone II.....$214

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2987 24/96 Fax 110V.....348

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03980 Mac Lc 24/96 Sendfax.....245
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03314 ProModem 2400 Se Plus.....245

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00256 Relisys Tefax W/Autofax.....869

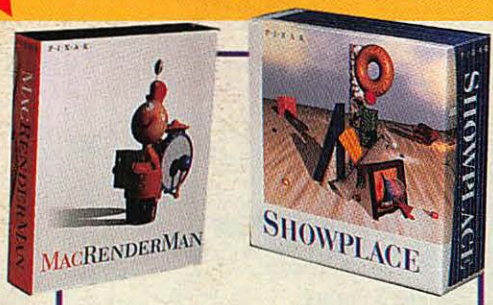
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01057 Courier HST STD V.42.....675
03665 Courier HST DUAL STD.....



Dove Fax Plus **$395**

DoveFax Plus offers the most sought-after fax software features such as: full background operation, pre-scheduled transmissions, customized cover sheets and more! The DoveFax Desktop can be upgraded to the DoveFax Plus with the simple addition of a microphone and software.

#03514 Fax Plus.....$395
#03318 Fax 24/96.....$294



PIXAR Showplaceand MacRenderMan **$548**

Pixar Showplace™/

MacRenderMan™ is a ocmplete picture-making tool. You orchestrate objects, lights and cameras, just like a pohotographer arranges a studio. It accepts models from any application that outputs RIB files.

#00030 Showplace.....$548



MicroTouch Systems UnMouse

The UnMouse does everything a mouse can, only faster, easier and in less space. To move the cursor simply slide your finger over the glass surface. To make a selection, merely press down. The UnMouse also serves as an extended keyboard. With its one million touch points the UnMouse also doubles as a graphics tablet.

$180

#03412 UnMouse.....$180

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00193 Monitor FPd Classic.....579
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03926 Rival 19 Mono Mac Se.....1,199
03925 Rival 19 Mono Mac SE30.....1,199
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03662 RasterOps Clearview/GS II.....1,675
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00035 RasterOps 24S.....589
02627 Colorboard 264/30 24Bit 351.....675

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02566 14 Inch Sony 1304 Clr Monitor...795



MegaGraphics Rival LC Monitor **$1199**

Make your new Mac LC into a power workstation! Rival can work in tandem with the built-in Apple monitor to give you a two-display system. 19" Rival has 1024 x 826 resolution at a flicker-free 75 Hz refresh rate.

#04014 LC Monitor..$1199



Sigma PageView Monitor **$850**

The PageView GS monitor supports 16 shades of gray at 640 x 870. 75 Hz refresh provides flicker-free display. Paper-white phosphor, tilt-swivel base, front panel on/off switch and more.

#03857 PageView.....$850

500 computer accessories



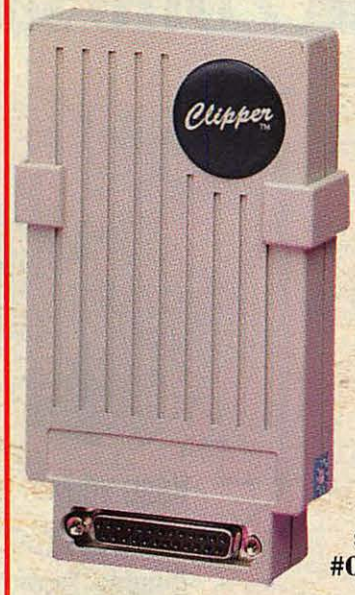
Cutting Edge Removable Hard Drive **$589**

They are not just for backup anymore! At 20 milli-seconds average access speed this high performance drive is faster than most fixed drives. When you need additional storage, simply add another cartridge. Performance, flexibility and security.

#03301 45 Mb Hard Drive.....$589

Independently fused AC outlets, eliminating power surge damage, two EMI filtered AC outlets for single switch power up, a push button SCSI ID selector and a louvered chassis reducing noise levels by 50%





IDS Clipper 40 Mb Hard Drive

$499

The new ultra compact Clipper from iDS delivers powerful storage capabilities and convenient portability in one tiny package. Weighing just 10 ozs, the Clipper fits easily into a briefcase and plugs directly into the back of any Macintosh computer via its unique pass-through SCSI port. The Clipper features full System 7 compatibility, automatic termination, a rugged 100g shock rating, a two year warranty and comes pre-formatted with SCSI Express Utilities and over 10 Mb of shareware software.

#00807 Clipper $499

Keyboards and Mice

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01584 Mac 101E Keyboard -New 128
03326 Switchboard 158

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02813 Mac Pro Kb 105 Plus Keyboard ... 144

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03780 Switchboard Switch Track Ball 97

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01292 Trackball 107

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Micro Touch Systems
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03629 Little Mouse A+ (512/Plus) 74
03630 Little Mouse For ADB 74

Advanced Gravis
02740 Mousestick Joystick 512 & Plus 64

Kraft
00941 Joystick Quickstick 512 & Plus 39
01990 Joystick (Premium III) ADB 49



Kensington Turbo Mouse

$104

Turbo Mouse. Winner of the 1987, '88, and '89 Macworld World Class Awards for Best Input Device, Turbo Mouse is quicker, more precise and easier to use than any other mouse. Because the ball is on top, you move only the ball, not the whole mouse.

#01411 Turbo Mouse .$104

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03297 20 Mb External 328
05124 52 Mb QLPS Internal 399
00000 52 Mb QLPS External 499

Everex Systems
02161 EMAC 150 Tape Backup Drive 715
02047 EMAC 60T Tape Backup Drive 649

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04002 52 Mb QLPS Internal 299
00019 105 Q Internal 499
03683 105 Mb Q External 549
03685 170 Mb Q External 928

iDS Livingstone Tech
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00144 20Mb Clipper 399
00037 40 Mb Pro 299
00171 Wip Drive 100Mb QLPS 819
00172 Wip Drive 120Mb 739
00802 40 Mb Removable 589

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03949 Tsunami 105 Mb QLPS 915
03698 Tsunami 120 Mb Hd Q 1,125
03699 Tsunami 170 Mb Hd Q 1,225
03700 Tsunami 210 Mb Hd Q 1,325
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03687 Superfloppy 1.4 (1.4/800) 448
02181 Infinity 40 Turbo Hd Rem 699
03691 CD ROM Drive 699
00450 645 Mb Ext Hd 2,599
02182 Infinity 40/40 Turbo Hd 1,399
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02851 Infinity Optical 600 Mb Hd 3,794
00442 Pl 1.2Fh Gb External 4,149

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00289 Cache-In (IIci Cache Card) 194
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00040 030 50Mhz IIcx W/Fpu 2,299

PowerCache
03812 50Mhz IIci W/Fpu 1,950

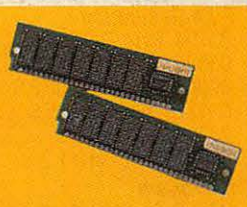
Dove Computer Corp
03228 030 Upgrade Mac II W/Virtual 528
03230 030 Upgrade Plus W/Virtual 528
03822 Upgrade 030 IIx W/Virtual 528
03820 Upgrade 030 Se W/Virtual 528

Total Systems
03752 Gemini II 030 40Mhz W/Fpu 1,850
00047 Gemini II 030 40Mhz W/O Fpu .. 1,325

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02723 68882 Co-Processor 50Mhz 349

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$47



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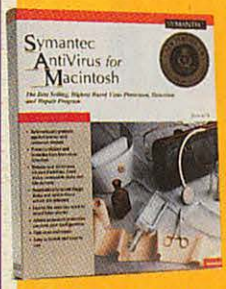
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The Symantec Anti-Virus for Macintosh detects viruses by monitoring the suspicious activities that characterize them. The INIT portion acts like a watchdog during startup to detect viral activity. The CDEV portion operates during normal Mac usage and offers a number of options for checking disks and folders as you work. SAM has an Audit Trail to keep track of its activity and your responses.

#00116 S.A.M. 3.0 ..... $66



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Norton Utilities for the Mac gives you an unbeatable combination of disk and data recovery software, along with disk optimization utilities. Now you can keep your valuable disks and data safe, secure and operating smoothly. It provides three levels of unerase, designed to give you optimal recovery options. The advanced diagnostic routines dig deep into the Mac operating system tool box to search for and recover lost data in minutes. With the Norton Utilities you can even unformat an accidentally-formatted hard disk. You also get Speed Disk, a powerful disk defragmenter and optimizer to significantly increase system performance by reducing data access time.

#03279 Norton Utilites $83

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Synex
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03142 MacEnvelope 5.0 56

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03370 Fast Label 2.0 42

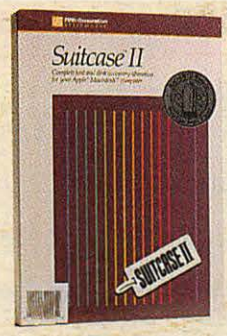
Williams and Macias
00401 Sticky Business Plus 86
03324 MyDiskLabeler III 41
03325 Disk Finder 24
02420 Sticky Business 50



Microseeds Redux $48

Redux backs up your files painlessly and quickly so that you can work without worrying about the health and well-being of all the data on your hard disk.

#01946 Redux $48

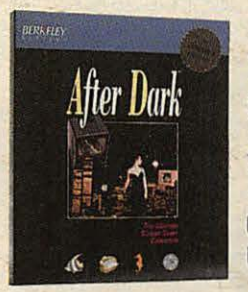


Fifth Generation Suitcase II $48

Suitcase II expands your font and desk accessory menus to as many as 255 items each. Lets you directly install and use any font, DA or KEY. Configure special Font/DA files for each application. Helps keep your system file to a manageable size.

Fifth Generation Systems List: $60

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After Dark 2.0 prevents screen burn-in and it does it with style! In fact, use any style you choose including fish, flying toasters, lightning bolts, meteors, abstract art, crawling worms, a jump to light speed, or a basic dimmer. Also features system IQ, password-protection and sound!

#02785 After Dark 2.0 ... $22

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Beagle Bros. Inc.
03219 Flash 124

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03118 Gator Share Software 1,350

CE Software
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02615 DaynaFile Dual 360K/1.44Mg 649
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02613 DaynaFile Dual 360K/1.2Mg 649

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02506 Soft PC 1.3 241

Orange Micro
03562 Orange 386 OS2 16Mz 1695
00059 Orange 386 20Mz Card 1839



TOPS 3.0 Network Bundle

$186

TOPS 3.0 provides a complete network/E-Mail solution for any combination of Macs, IBM PCs, and Sun Workstations. With TOPS every computer is a server and each user decides which files are public or private. TOPS follows AppleTalk File Protocol so AFP-compatible multi-user applications will run properly. Includes TOPS Spool for background printing on the network, and a 20-user package of InBox 3.0.

#03167 TOPS 3.0 ..... $186

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00228 MacCon + 30IEt64 304
03645 MacCon SE/30 E En 349
03646 MacCon+ 30I Et 269
03647 MacCon + 30IE 64 304
03648 MacCon SE E En 269
00020 MacCon+ 30IE 269
03642 MacCon + II Et 64 En 304
00029 MacCon+ LC E&T 269
03641 MacCon + II E En 269

Cayman Systems
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03117 Gator Card E/II (II Series) En 458
03116 Gator Box En 1,955

Dayna Communications Inc.
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03548 DaynaPort E/II 284
00804 DaynaPort E/Z 284
00805 DaynaPort E/SI 284
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02542 Shiva Telebridge 408
02700 EtherPort II 350
02985 EtherGate 1,295
01615 Shiva NetModem V2400 338
03251 Shiva NetModem V.32 9600 1,165
02685 Fast Path IV 1,885



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The StarController EN repeats Ethernet signals over 12 ports and monitors network traffic and error rates. It's fully compliant with the IEEE 10BaseT standard, so it supports a variety of Ethernet devices, from PCs to VAX mini-computers. It continuously checks the connection to each device, automatically shutting off unused ports to prevent disruptive signal error. StarCommand 2.0 management software, included with the PhoneNET Star Controller EN, continuously monitors your network as a background application running under MultiFinder.

#03207 PhoneNET Series 500 ..... $1,588
#00829 PhoneNET Series 300 ..... $824

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03474 Farallon Portable Pak 328
00199 Te-447 Rj-45 Patch Panel 199
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01224 Turbo Net - DIN-8 19

Sitka Tops
02223 Teleconnector - DIN-8 22



Shiva NetModem v.32

$1165

The NetModem V.32 is a 9600 bps modem that is designed to be shared over AppleTalk. The NetModem also includes Dial-In Network access software which allows a remote Mac or PC to dial into the network and use electronic mail, printers and other network resources.

#03251 NetModem $1,165

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some other ground-breaking application is the software equivalent of believing in Santa Claus.

So the action has shifted to a more general, systems-wide approach to increased productivity. Since technoweenies with UNIX machines have had this problem mastered for years, the goal now is to bring the cosmically inscrutable but undeniably powerful methods down to the friendliness of the Mac.

Unfortunately, this approach doesn't really produce software that encourages you to use the computer creatively. Instead, it ends up automating or simplifying something you would have done anyway. This is a noble goal, but it ain't rock and roll.

The bygone good old days of the Macintosh were like those movies where nervy homesteaders lined up their wagons and raced off to claim pieces of huge virgin territory. If Frontier and its ilk are indications of what's hot (and Winer told me he believes Frontier is—*shudder*—the next VisiCalc), we've gone from homesteading to farming to bulldozing orchards for metropolitan development. That's the future of the Mac—trying to squeeze the last few ounces of productivity out of an aging system. Since the Mac is already fairly productive, it's not an easy task, which is why you need such wirehead accoutrements as programming languages to pull off the trick.

Winer seemed chagrined when I tried to explain this to him. To him, Frontier *is* rock and roll. "Frontier is for the people who don't need it explained to them," Winer insists. "You simply can't do everything you want to do by dragging icons around." Frontier gives you power, he explains, but "it's not child's play."

He's right, of course. We have bigger demands in the new era, and it won't be easy to satisfy them. But then I think back to what I first loved about the Mac: using it was like . . . child's play.

Too bad we grew up. And too bad that one day, like the rest of us, the Mac is going to die. M

Macworld *columnist Steven Levy is writing a book on artificial life.*

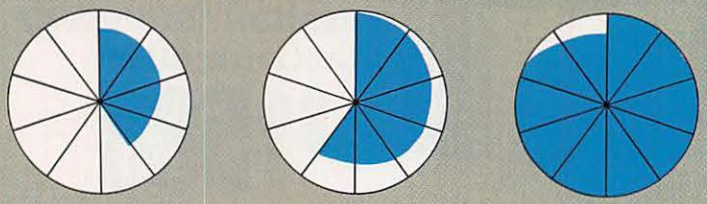



All video display terminals (VDTs) emit electromagnetic radiation (EMR) through the screen. The photo on the left is a visualization of EMR in red from the screen. The photo on the right shows that the NoRad Shield™ virtually eliminates screen-emitted E-Field EMR and better than half of magnetic EMR.*

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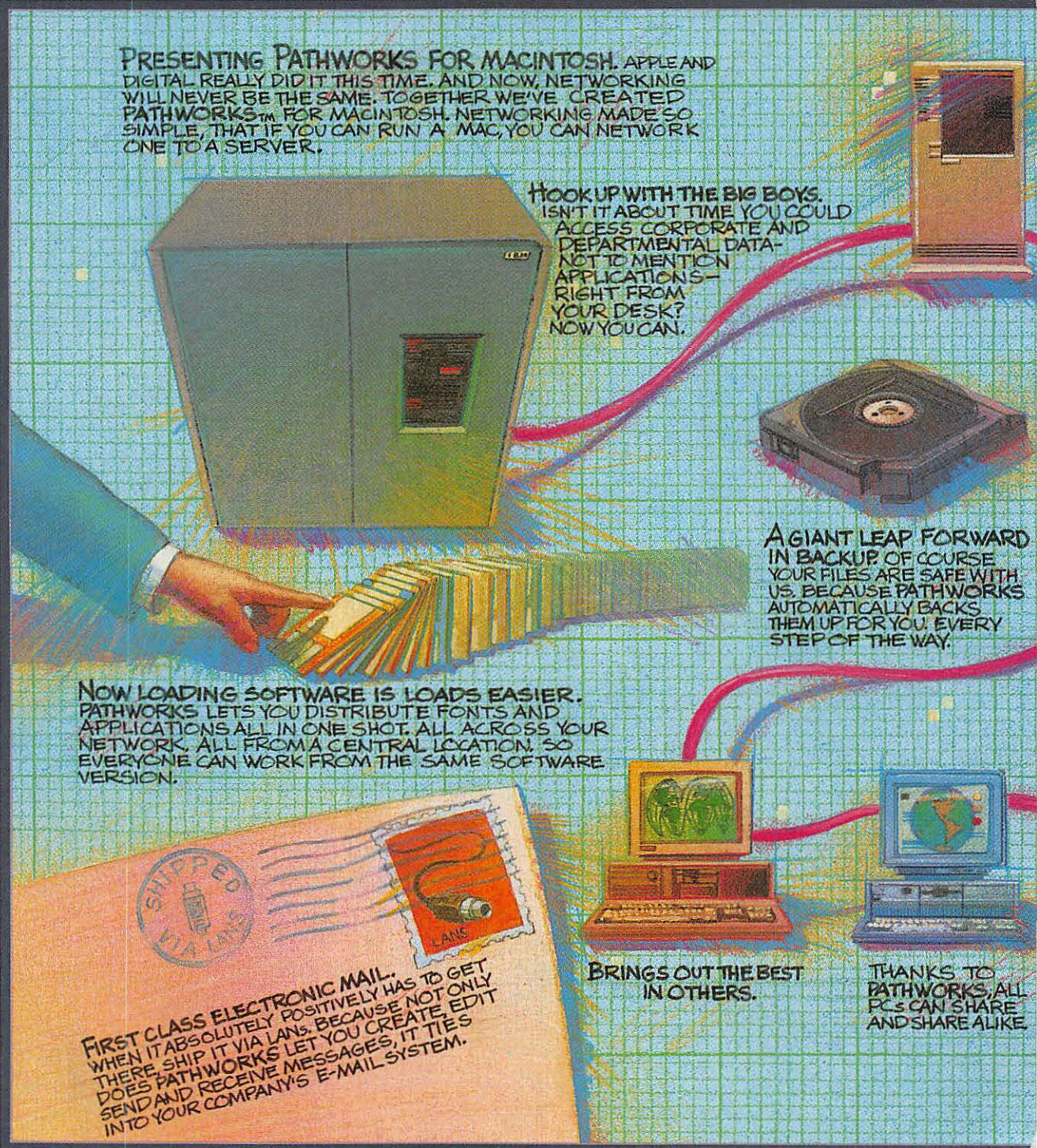
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Toward Healthier Computing

THERE ARE PLENTY OF PRODUCTS, BUT NO SIMPLE ANSWERS FOR ERGONOMICS CONCERNS

BY DEBORAH BRANSCUM

Several companies are developing alternatives to conventional keyboards, and a whole host of so-called ergonomic computer equipment and furniture is now available. But as many computer users are discovering, there's no simple answer nor set solution for preventing and treating the muscle and nerve injuries called cumulative trauma disorders (CTDs).

Several simple steps can make a workstation more comfortable. They include adding a copyholder at eye level next to your monitor. Putting the keyboard at the height that keeps your arms and wrists at a neutral angle, parallel to your thighs. And adding a wrist rest to the front of the keyboard if extra support seems necessary. But such changes, while useful, are probably not enough to prevent or diminish CTDs. Experts say job design may be the most important factor because stress, deadlines, repetition, and force all contribute to injuries.

"The issue of workstation design has been greatly exaggerated," says Rani Lueder, president of Humanics, an office ergonomics consulting firm in Encino, California. "Having good ergonomic seating is important, but it's not going to prevent carpal tunnel syndrome." Employers often want easy answers, says Lueder, but reducing injuries requires looking at the stresses in the workplace, the supervisory relationships, task design, organization structure, and the reward system—as well as the furniture.



JEANNE STACK

Logitech (left), Mouse Systems (top), EMac (right), and MicroTouch are among the many companies offering alternatives to the mouse.

Dr. Linda Morse heads the Repetitive Motion Institute in San Jose, California, and has watched the treatment caseload grow from 3500 patients in 1986 to 9000 in 1990. Most patients are computer users. According to Morse, a perfect work setting is meaningless unless you deal with work practices. As a consultant she looks for a rotation of job tasks and breaks from computer work: "We think people should stand up and stretch, shake hands and shoulders, every 20 to 30 minutes at least."

"The most useful breaks are microbreaks. But they're very individual," says Tom E. Signore, a consultant and staff ergonomist for Raychem Corporation in Menlo Park, California. "The key to healing in the human body is recovery. And each person is different."

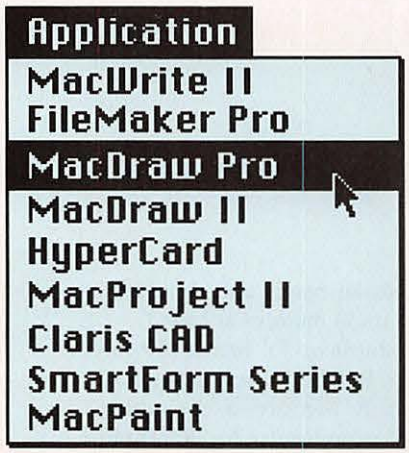
Lueder agrees that rest breaks are important and points to one study that shows people are taking fewer rest breaks now than they did in the 1980s. "We're working harder because we can, through automation, and because we have to, as companies downsize," according to Lueder.

Regulations and Research

Growing concern about the resulting problems has sparked calls for research and regulation. San Francisco's controversial computer ordinance, which went into effect early this year, establishes computer equipment and furniture standards for VDT (video display terminal) operators at most larger businesses, and requires 15-

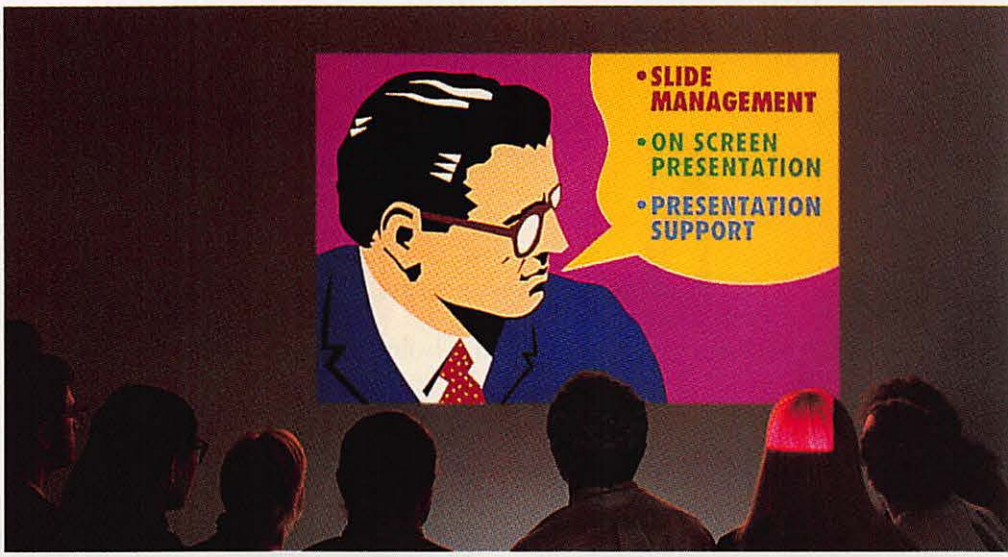
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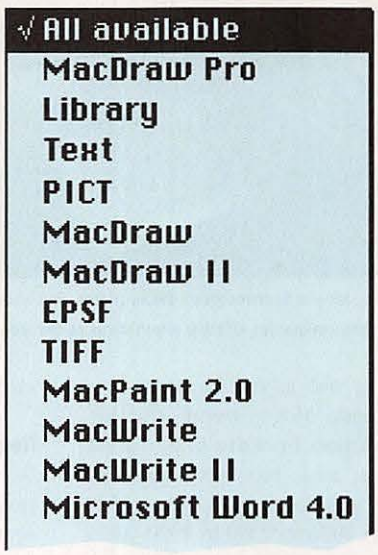
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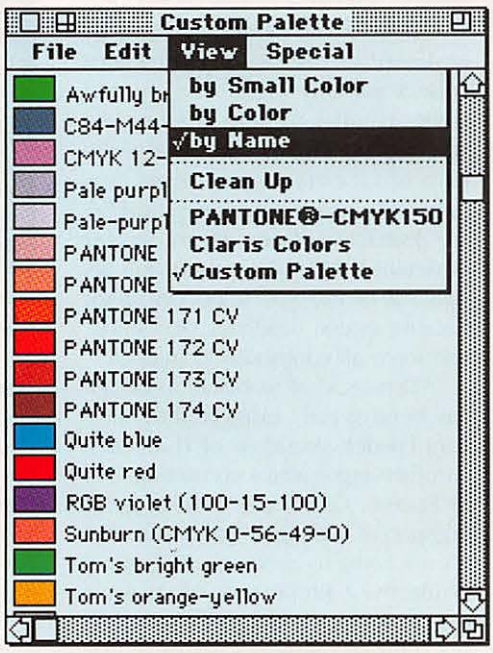
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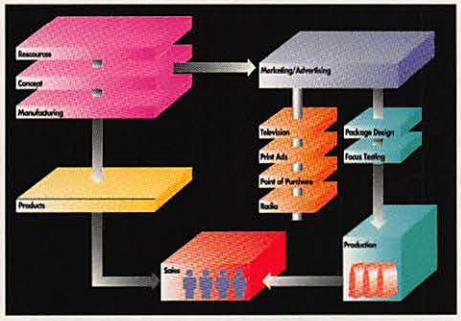
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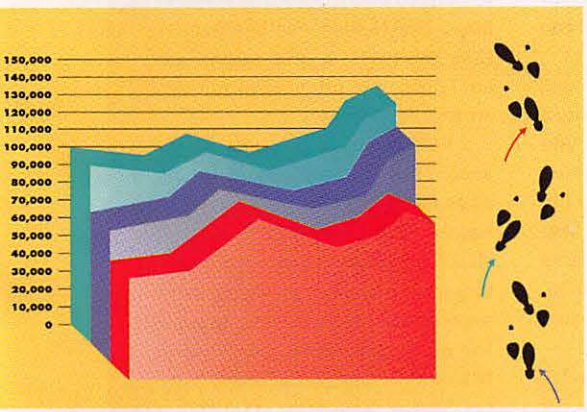
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DO MICE BITE?

Keyboards are one potential source of injuries (see *Conspicuous Consumer, Macworld*, October 1990). But some experts believe that mice may be dangerous as well. "To my mind, the mouse is more prone to causing injury than the keyboard," says Rani Lueder, an ergonomist in Encino, California. "I have seen many workers injured with the mouse because of unnatural and constraining finger positioning, continuous gripping, and maintaining elevated and unsupported arms."

Alternatives to the conventional mouse range in price from $100 to $235 and up. Mouse Systems (415/656-1117), for example, sells the Little Mouse, a single-button optical mouse that requires less force to click than Apple's mouse.

One popular trackball is the Turbo Mouse from Kensington (415/572-2700). EMac (415/683-2222) and Logitech (415/795-0801) recently launched radically new designs in trackballs (see photo on page 67).

Curtis Manufacturing (603/532-4123) sells the MVP Mouse, actually a three-button trackball, with a foot-pedal option. Like several other trackballs, the MVP Mouse includes a cdev for assigning functions to each button. The trackball and foot-pedal combo from Kraft Systems (619/724-7146) doesn't allow you to vary what the buttons do. But it provides a button you press once for double-clicks (Logitech's product can function in the same way).

The UnMouse from MicroTouch Systems (508/694-9900) is a small touch-sensitive pad that lets you double-click, pull down menus, draw, and use macros with your finger. Voice input devices may help some. Voice Navigator II is available from Articulate Systems (617/876-5236), and Voice Express can be had from MacSema (503/757-1520).

Make sure that any input device you buy can be returned, since it's impossible to judge if a product meets your needs without using it for some time.

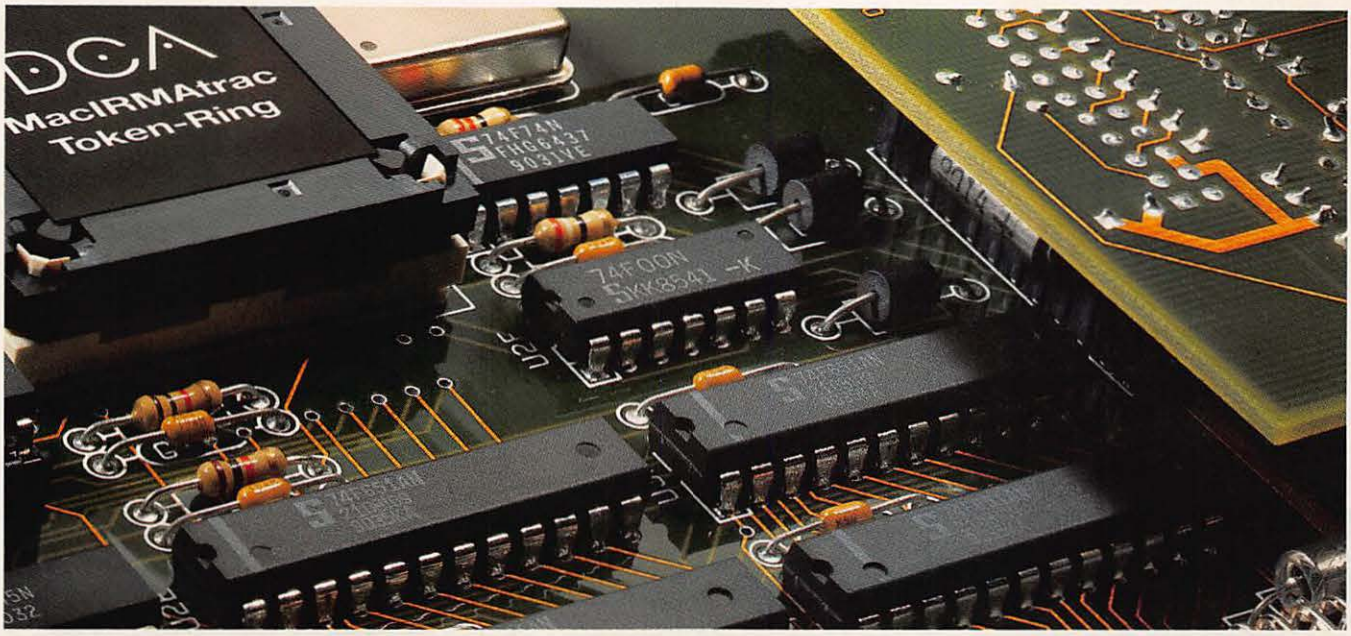
Software Aid A general program some users may find helpful is LifeGuard, from Visionary Software (800/877-1832 or 503/246-6200) (see *Reviews, Macworld,* May 1991). LifeGuard reminds users to take needed breaks (at preset intervals) and suggests exercises and alternatives to break the cycle of overwork.

Magic Typist from Tactic Software (305/378-4110) and WordWriter from McIntyre Computer Systems (313/645-5090) try to predict the word you want and offer a selection list. The Sword, from a company of the same name (619/224-0139), features automatic keyboard shortcuts that the company claims can cut keystrokes by up to 25 percent.

Learning More The American National Standards Institute (212/642-4900) has established standards for personal computer workstations, chairs, and related equipment. The Computer Injury Network (213/207-1653) was founded last October by Samantha Greenberg, who won a $40,000 workers' compensation claim this year for a hand injury she traces back to seven months of computer bookkeeping. Greenberg, a one-woman information campaign, is launching a support group for injured users in the Los Angeles area. The Human Factors Society (213/394-1811), a professional association, includes ergonomists among its members.

VDT News is the best single source I've seen for information on all aspects of computing and health issues. This bimonthly newsletter also runs an annual product directory that includes services, trade associations, and resource groups. For a one-year subscription, send $87 to P.O. Box 1799, Grand Central Station, New York, NY 10163.

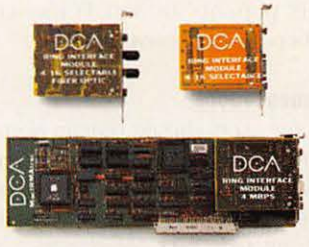
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Circle 71 on reader service card

minute breaks from keyboarding every two hours. California state legislation is in the works, although not assured, and Los Angeles, Berkeley, Detroit, New York, and other cities have expressed interest in local laws. "A lot of people are getting on the bandwagon in terms of local ordinances," says Dr. Thomas Armstrong, who chairs a National Safety Council committee founded late last year to develop guidelines for controlling CTDs. Armstrong, an ergonomist with the University of Michigan in Ann Arbor, says the group plans to look at existing research to reach a consensus standard on the best procedures for dealing with CTD problems across all industries. The Committee Z365, as it is called, has been accredited by the American National Standards Institute. A final report isn't expected for two to three years.

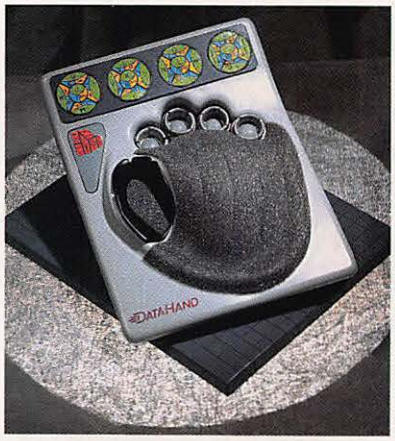
The Occupational Safety and Health Administration (OSHA), which is represented on the Z365 committee, is expected to issue preliminary ergonomics guidelines for all industries in November. Meanwhile, an industry group that includes Apple Computer, IBM, and insurance companies and furniture manufacturers is pressing for a national research agenda for office ergonomics concerns. Ergonomics consultant Bob Bettendorf of Stamford, Connecticut, is chairing the committee, which has lofty aims but little money to carry out research.

The lack of research—and funding for it—may be the most distressing aspect of the problem, because there are so few solid facts. Dr. Morse calls CTDs an epidemic, while Dr. Armstrong says it's not clear that there are actually more CTD problems now than in the past. Dr. Morse says the proper wrist rest (flat, cloth-covered foam rubber the same thickness as the keyboard) can make a major difference for users. Hand specialist Dr. Robert Markison, however, has found that his patients in San Francisco rarely benefit from wrist rests.

Recommendations

Computer users should remain skeptical in the face of companies seeking to "profit from pain," as one newspaper put it. "Don't take for granted something that says 'ergonomic' is

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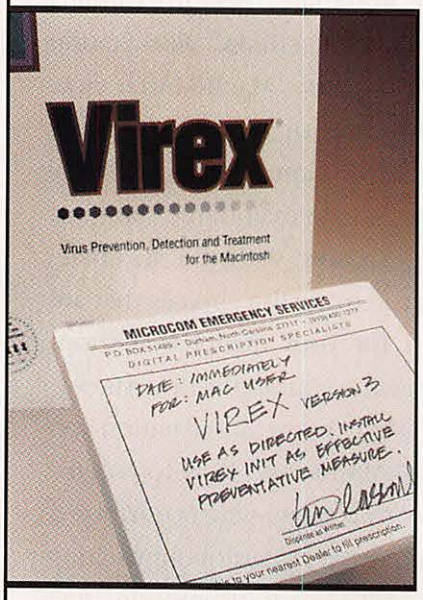


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The DataHand is an alternative keyboard under development by Industrial Innovations.

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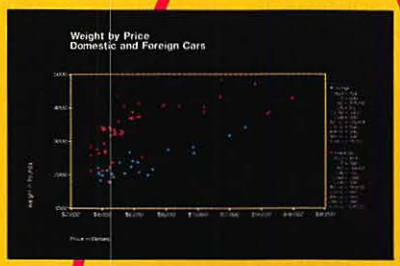
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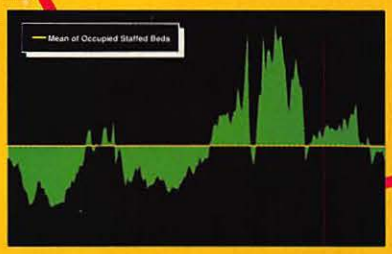




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going to solve your problem," says Dr. Armstrong. "Challenge the supplier for data—not testimonials but tests that show the product actually reduces carpal tunnel syndrome or whatever." Think of new devices as experimental and judge them on a case-by-case basis. If you're a manager, don't make all your workers use a new product. Try it out and get worker feedback first before placing an order for many devices.

If you need treatment, Dr. Morse suggests that you call in advance to see if a doctor is familiar with workers' compensation and with workplace intervention. Because many doctors are unfamiliar with CTDs, you may want to look for board-certified occupational medicine specialists or occupational medicine clinicians, who should be aware of CTDs. "They also have an understanding of the need to intervene in the workplace, which many physicians don't," says Dr. Morse. "Another alternative is physical medicine and rehab physiatrists, who are soft-tissue musculoskeletal experts quite frequently located in sports medicine clinics."

Keyboard Alternatives

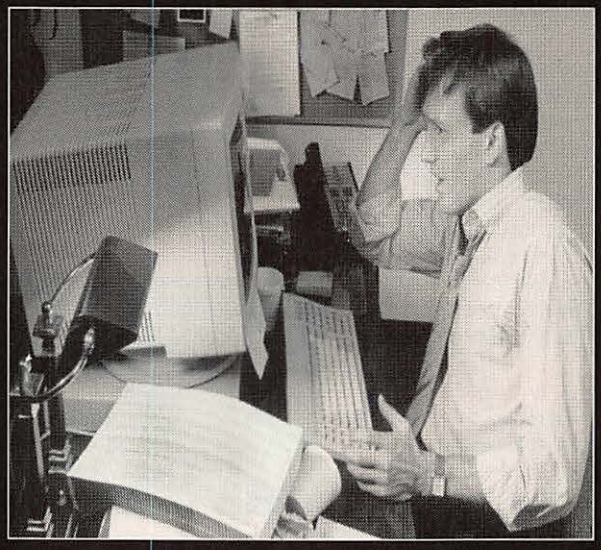
Several innovative prototypes for the Macintosh seek to improve upon—or replace—the flat QWERTY keyboard.

The Bat is a pair of devices that allow computer users to input information with one hand and use a mouse with the other. The palm rests on a platform above seven keys pressed by fingertips and thumb. Finger combinations similar to piano chords create letters and numbers on screen, according to Ward Bond, president of Infogrip (504/336-0033) of Baton Rouge, Louisiana. The company plans to sell limited preproduction models for $495 beginning in June of this year.

The DataHand is a keyboard- and mouse-substitute divided into left-hand and right-hand units. A user's hand is placed over a palm support, with fingers curling into four wraparound keys. The wraparound keys move in five directions: down, forward, back, left, and right. Inventor Dale Retter claims that experienced typists must relearn only four keys out of the middle three rows. "The keys require about 25 percent of the pressure of a standard keyboard," says Retter, president and CEO of Industrial Innovations (602/860-8584), a small start-up in Scottsdale, Arizona. A Macintosh version of DataHand is

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By JON SWARTZ
Apple Computer Inc. is
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abroad.
According to highly reliable
Apple is mulling a "voluntary re
program—layoffs—at its 100-pe
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Sources speculated that staff
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expected to become available next year for $1200.

AccuKey is an input device originally developed for navy use in missile control, according to inventor Larry Langley. Eight soft keys are placed in a shallow V shape; keys have forward, backward, and middle positions. Users create characters by pressing different key combinations, which Langley claims can be learned in a week. A company called AccuCorp is working to finish and market the device, which will first be available for the IBM PC and compatibles. A Mac version is also planned to sell at an undetermined price. AccuCorp can be contacted at 3959 Electric Rd., Suite 100, Roanoke, VA 24018.

One well-publicized invention is the Tony keyboard from Silicon Valley inventor Tony Hodges (415/323-4801). The Tony keyboard can be positioned like a standard device or split and raised up to 90 degrees, like an upside-down V (see "Warning: Computing Can Be Hazardous to Your Health," *Macworld,* January 1990).

Dr. Armstrong warns that any one alternative keyboard probably isn't going to solve all CTD-related problems. "Things like the Tony keyboard are quite effective in eliminating a couple of types of stress, but won't do anything to eliminate the repetitive stress or the localized mechanical stress," he says. "If you take a Tony keyboard and use it hard enough and long enough . . . you'll probably experience problems."

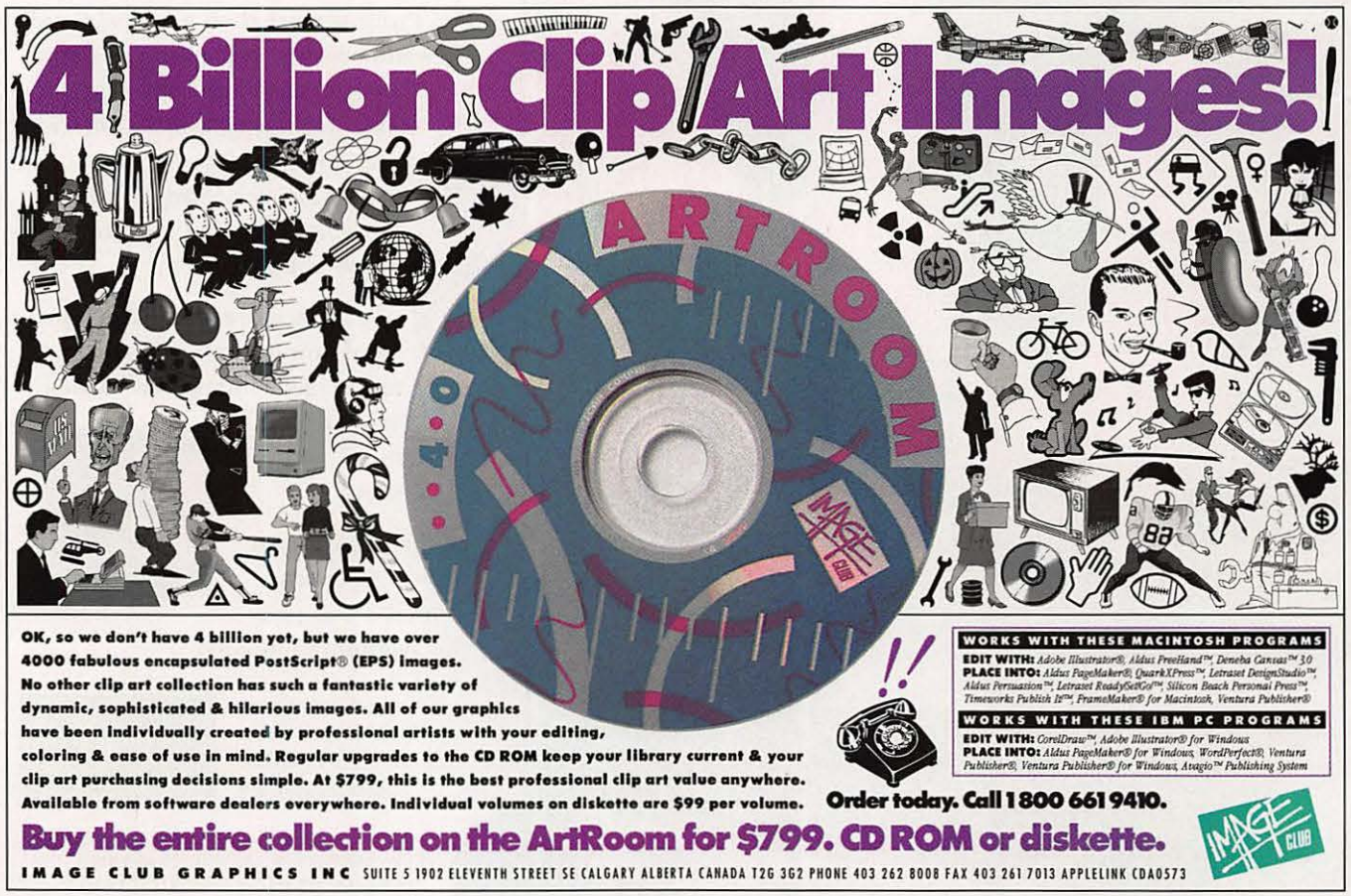
Dale Retter and Tony Hodges have both approached computer companies about licensing their input devices, and neither has had any luck. But the growing howl from injured users and product liability suits against computer system manufacturers in the airline and newspaper industries may help inspire new products from Apple and others.

"All of the major computer manufacturers are looking at input design," says Dr. Morse. "And they are doing so in a pretty good scientific way, actually testing the muscle strain of using the devices."

Users should demand serious testing from manufacturers to ensure that changes in keyboards, mice, and trackballs are actual improvements and not merely decorative advances. But we also have to pay attention to overwork, stress, and unrelenting deadlines. When it comes to injuries, "it's not really the equipment as much as how the workers interact with the job," says Lueder. It may be that the devices themselves are less important than how you use them. M

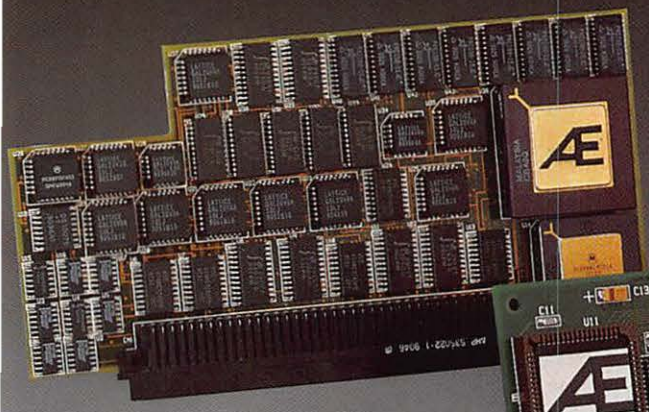
(Research assistance by Carolyn Bickford.)

Send nominees for sainthood to Service Heroes, Macworld, *501 Second St., San Francisco, CA 94107, or via AppleLink (Macworld1) or America Online (Branscum). Conversely, drop* Conspicuous Consumer *a line if a company is ignoring you.*

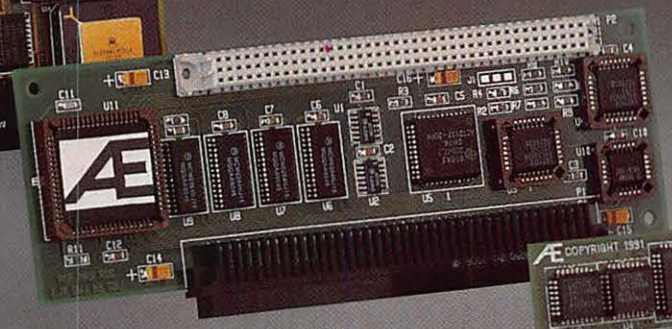


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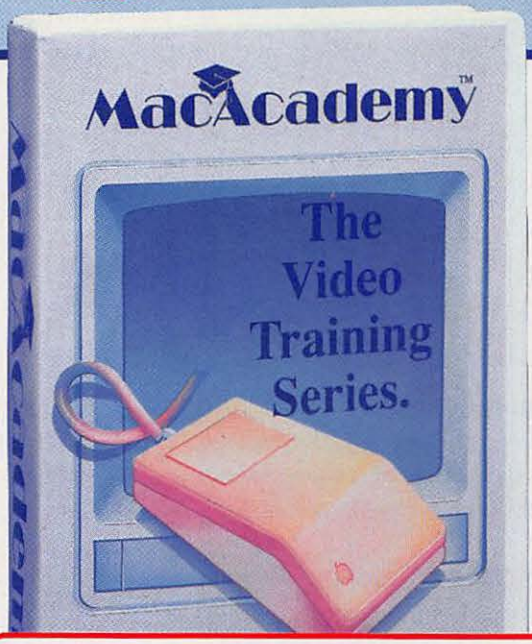
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You would be surprised at the number of people who have confided with me the fact that they've given up trying to learn some of the programs. They put the box on the shelf and write the expenditure off as a bad investment.

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Can you imagine how much money has been wasted on programs and computers that are sitting abandoned? Right now think of the people working on Macs in your office. Do they really understand the computer? Do they know what to do when it goes down? How many programs are each of your people using? Have they really mastered the programs they're using? Do they know the short-cuts and valuable techniques that will save you time, money, and increase your professionalism?

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- MacWrite II Part #2
- Macintosh Networks
- Utilities, CDEV's, Inits
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- Using System 7
- Design & Layout Techniques

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MACWORLD NEWS

by Dan Littman and Tom Moran

QuickTime: It's about Time

Apple's new system software, called QuickTime, manages events that happen over time—in particular, video—the same way QuickDraw has always managed the drawing of still images on the Mac's screen. To a user, QuickTime is a few pieces of software in the System Folder; to a developer, QuickTime is the foundation for making multimedia available in all applications.

One of QuickTime's chief functions is to mediate between software and hardware, freeing software developers from writing a different driver for each video board on the market. For example, on a Macintosh equipped with a camera and digitizing board, you could bring up QuickTime's simple console—a few on-screen VCR buttons—from inside a QuickTime-compatible word processor, record a note in digital video, and attach it to a memo. Anyone reading the memo could then play back the video note, even though the word processor knows nothing about video hardware. (Although QuickTime requires hardware only for video input, additional TV hardware can provide faster frame rates and larger TV windows.)

QuickTime provides software-only compression and decompression. It will ship with three compressors: a JPEG implementation for color images; a video-compression format to decompress and play video from a CD ROM or hard drive in a small (¼-screen) window at about 15 frames per second; and an animation compressor. Developers can add new compression formats.

QuickTime's Component Manager lets peripherals such as video digitizing boards tell the Mac what their capabilities are; the Mac in turn tells applications what hardware is available. Later versions of the Component Manager may allow programs to run a VCR, laser disc player, or color calibrator.

QuickTime will provide two new file formats. One is a track format, a container that can hold video; sound; and when third-party developers write new track types, closed-caption text, synching information for multilingual videos, and so on. The second format is an extension to PICT that attaches a thumbnail to any image; any QuickTime-compatible application can display the thumbnail.

Symmetry is making Mariah, its image-archiving utility, QuickTime-aware, so as you add an image to a Mariah archive, you'll have

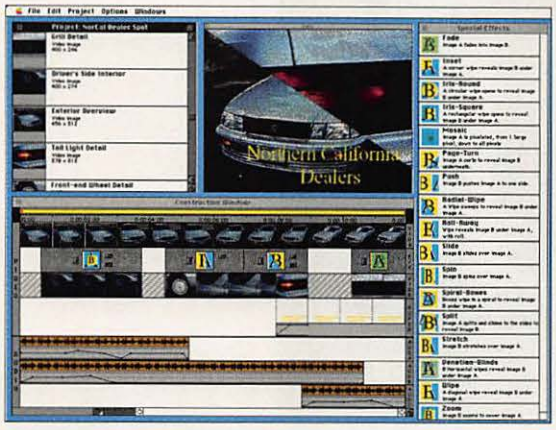


JOHN WILLIAM LUND

One of the products that can support larger TV windows under QuickTime is RasterOps' new 24XLTV, a 24-bit graphics board for NuBus-based Macs. The 24XLTV offers built-in graphics acceleration and TV capability.

a choice of several compression formats. Later, when you want to place the image in a page layout, a QuickTime-aware DTP package will decompress the image without Mariah's help. Symmetry is in Scottsdale, Arizona, at 602/998-9106.

At least two major third-party vendors are ready with hardware products that will take advantage of QuickTime. RasterOps has introduced its RasterOps 24XLTV board, which combines an accelerator with a 24-bit graphics board with TV capability. The RasterOps board supports the 13-inch AppleColor High-Resolution RGB Monitor and a series of RasterOps monitors ranging up to 21 inches. The board is compatible with RGB, S-Video, NTSC, PAL, and SECAM formats and supports full-motion video. With an optional piggybacked expansion board called the QuickPak Expansion Adapter, the board adds real-time compression and decompression of TV images. The board began shipping in May, at a suggested list price of $4995.



SuperMac's ReelTime software for TV editing and special effects works with the company's low-cost TV input board.

Meanwhile SuperMac is introducing what it calls the Video Spigot, a low-cost board meant to complement QuickTime by getting digitized video into the Mac from a VCR or a laser disc or similar device. The first versions will be for the LC and IIsi. A higher-end product, called Video Spigot Pro, is under development.

SuperMac demonstrated a very powerful TV-editing software application called ReelTime, which the company will include at first with the Video Spigot. QuickTime-compatible, ReelTime manipulates digital video, adding many special effects and editing utilities including sequencing. At press time, the price of the Video Spigot had not been set, but SuperMac said it hoped the price would be about $300 and that it definitely would be under $500. Video Spigot was slated to start shipping June 4.

For more information, contact RasterOps in Santa Clara, California, at 408/562-4200, or SuperMac in Sunnyvale, California, at 408/245-2202.

QuickTime users will appreciate falling hard drive prices, because even at 20-to-1 compression, video files eat a lot of disk space: a 1½-by-2-inch clip that runs 10 seconds in video-standard 16-bit color would consume roughly 350K of disk space.

Apple expects to ship QuickTime before the end of 1991. It will run with System 6.0.X and 7.0.X and will require no specialized hardware, but, at least in its first version, it will not run on the 68000-based Plus, SE, and Classic.—**D.L. and T.M.**

The Photographer's Network

Equipment developed by Leaf Systems for accessing and editing photographs digitally is making darkroom work at newspapers a thing of the past. Leaf's technology, which Associated Press markets to AP member newspapers, has already replaced 8 of 11 traditional photoenlarging machines at the *Columbus Dispatch,* and, says the *Dispatch*'s director of photography Karl Kuntz, "[soon] we hope to be completely paperless, to do it all by scanning negatives, with no printing."

The three central components of Leaf's Picture Desk are a proprietary file server, the Leafnet fiber-optic network, and a NuBus board to plug a Mac into the network.



TED RICE

Photography director Karl Kuntz of the *Columbus Dispatch,* where paper-free, chemical-free photo-editing is almost a reality.

A networked Macintosh user can edit color images on the file server with Leaf's software, or copy them to a local hard drive to edit them with an application like Adobe Photoshop. Leafnet runs at 40 megabits per second—about four times as fast as high-speed Ethernet. Since even a fast Mac can't absorb data that quickly, the NuBus board has its own buffers.

Leaf's software lets photo editors perform most functions of strippers and prepress operators. "We call it upstreaming," says Kuntz. "We used to send out all these pieces, and they'd put them together at the last minute. Now we send out whole pages."

Leaf's system also provides security features and access privileges, and can *slug* photos—add descriptive comments to them—and search and retrieve photos by slug lines. Features such as dodging and burning can be disabled to conform to a newspaper's photo-editing guidelines.

Where do the images edited on a Leaf server come from? The server accepts analog and digital images sent by modem, and Leaf also produces scanners that support several sizes of film, slides, and transparencies. The Leafax 35 is a portable black-and-white or color 35mm scanner with a built-in Telebit Trailblazer 19.2K modem and a C-Cube Microsystems compression chip for traveling photographers. Finally, Leaf is working on a film-quality digital back for Nikon cameras, which would eliminate the need for scanning completely.

Future plans call for running the Leaf server on nonproprietary hardware, probably an IBM RIS/6000, so the computer could be used for other tasks. Leaf Systems also has hinted that it might make its fiber-optic net-

(continues)

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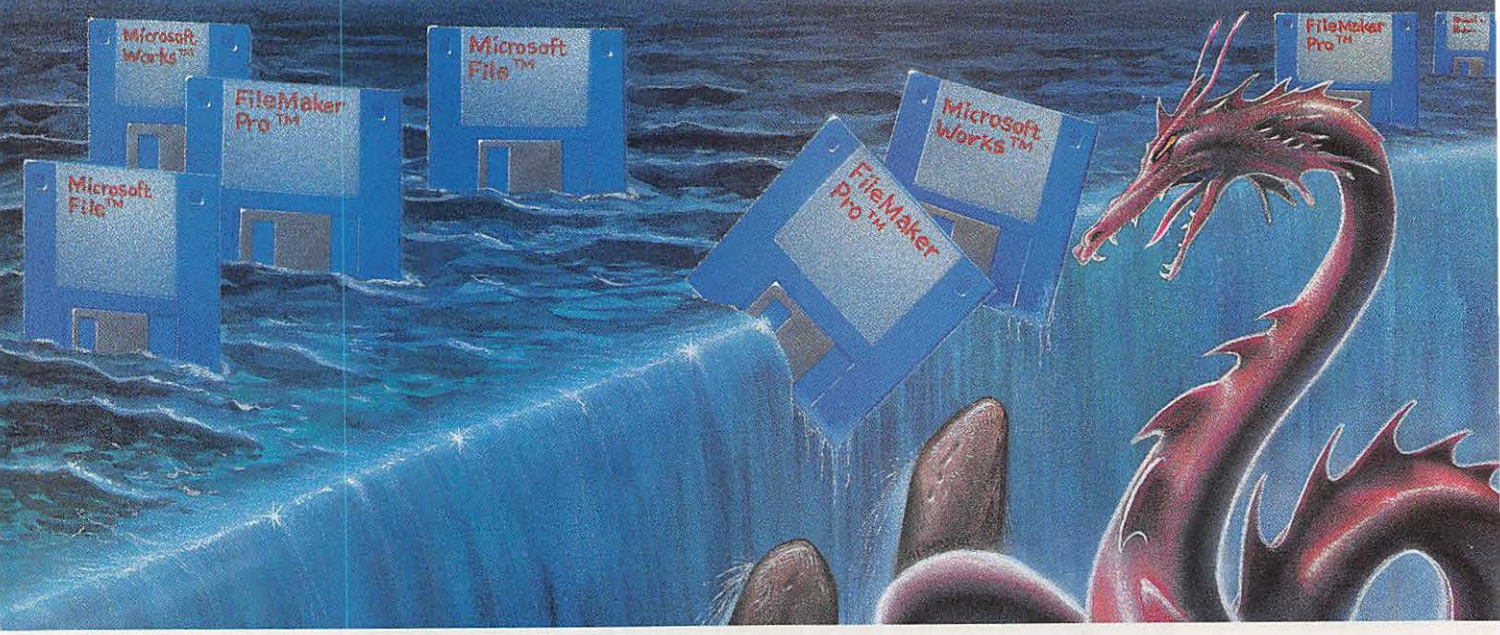
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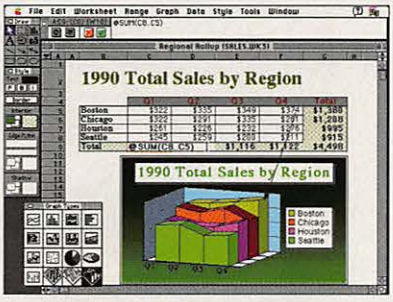
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work available for other purposes.

Pricing depends on system configuration. For more information, contact Leaf in Natick, Massachusetts, at 508/651-9715.—**D.L.**

Lotus to Flower at Last

Lotus has made several ill-fated attempts to enter the Mac market—first with Jazz, an integrated package many say was ahead of its time, then with Modern Jazz, which died before it saw the light of day, and recently with the politically unacceptable MarketPlace. But with a Mac version of Lotus 1-2-3 almost ready and the recent acquisition



Lotus 1-2-3 for the Macintosh sports plenty of Macintosh palettes. DOS-style menus are also available for pre-Mac Lotus experts.

of a Mac E-mail package, cc:Mail (see "Meta-Mail," *News,* April 1991), the Microsoft of the East is poised at last to storm the Mac community.

Lotus 1-2-3 for the Macintosh is file-compatible with the DOS, Windows, UNIX, and VAX versions of Lotus 1-2-3 and can read and execute their macros. Lotus 1-2-3 worksheets are three-dimensional, which makes slicing through complex data sets easier than with linked files in Excel's 2-D world (1-2-3 supports linked files as well).

Lotus 1-2-3 has a clean, easy-to-use interface. Its drawing tools live in floating palettes, and all dialog boxes are nonmodal—you can move them, shrink them, or access the worksheet without closing them. Worksheets, macros, graphs (1-2-3 provides 12 types of graphs including 3-D, with variations on each possible), and a running transcript that permits unlimited undos are all part of the same file; graphs (but not worksheets) can be collapsed into space-saving icons. For database access 1-2-3 supports Apple's Data Access Language and Lotus's own Data Lens, and can draw a user-modifiable data entry form based on the database's fields. The program also provides Backsolve, a built-in single-variable solver like Excel's Goal Seek.

What does 1-2-3 lack? It lacks Excel 3.0's nifty collapsible outlining feature; it doesn't let you create new number formats, something Excel has supported for years; and it can't calculate fractions, as Excel 3.0 does.

Recognizing that Ashton-Tate's marketing clout couldn't push the well-qualified Full Impact into corporate Excel sites, Lotus is counting on compatibility with its dominant DOS spreadsheet to do the trick. That's probably why Lotus decided against making its Mac entry with the revolutionary but incompatible-with-everything Improv, a spreadsheetlike tool for the Next computer that Mac enthusiasts would love.

Lotus 1-2-3 for the Mac will list for $495. For more information, call Lotus in Cambridge, Massachusetts, at 617/577-8500.—**D.L.**

Plain-Paper Color Surfaces at Last

Offering a long-awaited combination of critical features, Tektronix has introduced a 24-bit color PostScript printer that outputs tabloid-size paper at 300 dpi using phase-change ink-jet technology—and does it on almost any type of paper. Called the PhaserJet PXi, the printer uses solid inks that are melted before the print head sprays them onto paper or transparency film. The device prints on paper as large as 12 by 18 inches and accepts very thin and very thick paper.



JOE FELZMAN

The Tektronix PhaserJet PXi prints 24-bit continuous-tone color on plain paper that can measure up to 12 by 18 inches.

The basic PhaserJet PXi includes 10MB of RAM, but users can add 8MB more in 4MB increments. The 4MB RAM upgrades list for $995 each. With a total of 14MB, the printer can use its full print area of 11 by 17 inches on the maximum-size paper. The second RAM upgrade is for additional fonts, file buffering, and faster image processing.

The PhaserJet PXi is slated to include Adobe's PostScript Level 2, which adds device-independent color matching, compression, better font rendering, and other improvements. The printer incorporates a 24MHz Am29000 RISC processor for better printing speed. A full page of color takes about two minutes to print. Tektronix estimates that producing a page will cost about 5 cents for black text and 25 cents for a typical page of color.

The PhaserJet PXi is scheduled to begin shipping in July. For further information, contact Tektronix in Wilsonville, Oregon, at 800/835-6100.—**T.M.**

New Look for Panorama

ProVue's new Panorama II makes it easier for the database novice to get started, with improved documentation, a beginner's manual, and a simplified interface. At the same time, Panorama II incorporates some major changes that custom database developers will be sure to like.

For power users and developers, Panorama II provides variables and subroutine functions in PanTalk, its macro-programming language, and the new version adds more formulas, including hyperbolic functions. Panorama II also features a multiuser mode that allows several users to access a database on a network, though, unlike FileMaker, Panorama requires AppleShare, TOPS, or some other networking scheme (System 7's file-sharing feature should satisfy this requirement).

(continues)

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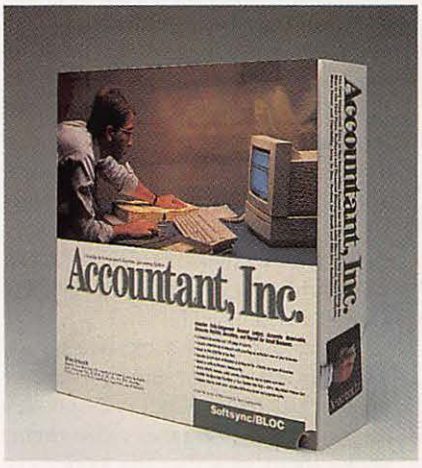
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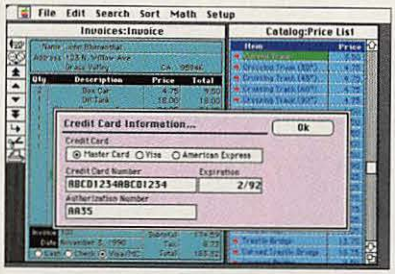
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A point-of-sale system in Panorama. The invoice file looks up prices in the catalog; it can also debit stock from inventory.

Panorama functions as a hierarchical database that can look up data in other files, and users can record or write macros to transfer information in both directions between files, something FileMaker doesn't support. This relational feature permits, say, an invoice file to debit an inventory file and add to an accounts receivable file automatically. However, Panorama lacks the data-integrity checking found in Oracle, Sybase, and other databases often used to develop accounting systems. Buttons, pop-up menus, and other graphics can be included in user-friendly templates.

Panorama loads files completely into RAM, like a spreadsheet, which makes searching and sorting very fast but limits the size of a file. FileMaker, by comparison, is disk-based.

Panorama II will list for $395, and ProVue will also market a zip code lookup and a spelling checker for Panorama at $39.95 each. The company also plans to develop a runtime version of Panorama. For further information, contact ProVue in Huntington Beach, California, at 714/892-8199.—**Carolyn Bickford**

Avery Rolls Out Label Printer

Avery, leader in the label market, has brought out its first hardware peripheral, a label printer that creates labels for envelopes, badges, or file folders at a rate of about four seconds per label. Called the Personal Label Printer, the device includes a thermal-transfer print head that has a resolution of 137 dpi. Like other one-at-a-time label printers currently available, the Avery printer requires no toner or ribbon.



LUIS DELGADO

A thermal-transfer printer that produces a label in about four seconds will be available from Avery as the Personal Label Printer and from CoStar as the LabelWriter II.

The printer was developed in conjunction with CoStar, which pioneered the market with its existing LabelWriter. CoStar will sell the new label printer under the name LabelWriter II in computer retail stores, while Avery will offer it through office supply stores and distributors. CoStar will also offer an upgrade, to the LabelWriter II Plus, which will print wider labels.

The Personal Label Printer comes with Avery's MacLabelPro software and printer driver. MacLabelPro accepts imported address data from other applications. Users can include graphics, such as clip art or a scanned logo, on a label and can use any font installed in the system. The printer hooks into the Mac's serial port.

The Personal Label Printer, slated to ship from Avery in August, will have a suggested retail price of $279.95, including a roll of 130 labels. Additional rolls will sell for $12.95 list. CoStar said it will begin shipping the $249.95 LabelWriter II and the $399 LabelWriter II Plus in July, with CoStar's own label-printing software. For more information, call Avery in Covina, California, at 818/915-3851 or 800/541-5507, or CoStar in Greenwich, Connecticut, at 203/661-9700.—**T.M.**

Prime Option 600-dpi Gray-scale Scanner

Prime Option recently unveiled its Phovos 600GS, a 600-dpi scanner that produces 256 shades of gray and works either with IBM PCs and compatibles or with Macintoshes. Intended for high-end DTP, OCR, and document processing, the Phovos 600GS uses a high-resolution charge-coupled device sensor to scan a letter-size page in about ten seconds. The scanner can

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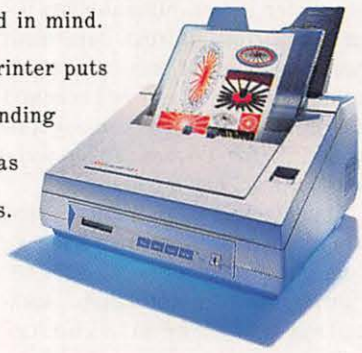


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be set for resolutions ranging from 60 dpi to 2400 dpi, with proportional changes in the speed of the scan.

When ordered for the Mac, the Phovos 600GS comes with Adobe's Photoshop LE; a bundle for a PC running Windows includes Astral's Picture Publisher Plus. An optional document feeder can load up to 30 pages automatically and comes with either a Macintosh or PC version of Calera's OCR software.



LUIS DELGADO

The Phovos 600GS scanner from Prime Option scans in 256 shades of gray at 600 dpi in about ten seconds.

The Phovos 600GS carries a suggested list price of $2995 for the Mac version or the PC version. The scanner is now shipping, according to Prime Option. The optional 30-sheet document feeder lists for $695. For more information, call Prime Option in Torrance, California, at 213/618-0274 or 800/828-9877.—**T.M.**

Earth to Apple: We Read You

Macintosh networking companies breathed a collective sigh of relief when word leaked out that Apple, persuaded by third-party developers, had stopped development of AppleTalk Management Protocol (AMP) and decided in favor of the industry-standard Simple Network Management Protocol (SNMP). Apple refuses to acknowledge that AMP ever existed, saying that the company had always planned to support SNMP, but a number of Macintosh networking developers confirm that Apple had briefed them on AMP.

SNMP was developed to work with the industry-standard TCP/IP protocol for communicating between different types of computer. Over the past two years, SNMP has become the de facto standard for heterogeneous network management. For networking, and network management in particular, interoperability is a major requirement.

AMP would have required an AppleTalk Data Stream Protocol (ADSP) transport base, restricting AMP use to AppleTalk nets. It would have lacked a management information base, a database that explains to the network-management software what it must manage. Without the database, management software would have to understand packet types, requiring complex programs that would be more difficult to develop. On the other hand, AMP had authentication and encryption built in, unlike SNMP, where they were added as an afterthought.

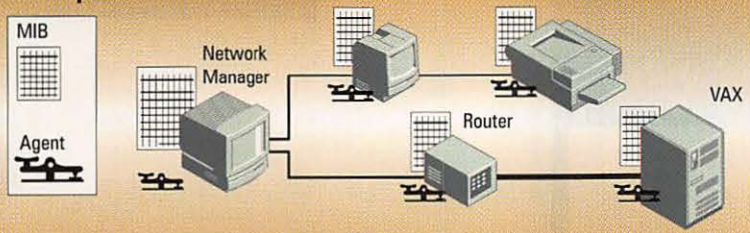
"We're generally happy that Apple is going with something more of a standard," says an engineer at one Macintosh networking firm. "We're a multiprotocol company these days, and having a more widespread management protocol is a lot better for us."

Apple has not announced any SNMP products, but InterCon of Herndon, Virginia, is developing WatchTower, a $2495 product that can manage an SNMP internet from a Mac. InterCon is at 703/450-7117.

—**Sharon Fisher**

(continues)

Components of SNMP



Network devices such as routers, bridges, printers, and computers maintain agents, which respond to queries from the network manager. The devices also contain a management information base (MIB), a self-description device. Management software checks those MIBs against a master MIB to determine what information each device's agent can provide. Hardware vendors write MIBs to conform to universal standards or adopt MIBs designed by standards organizations, so that management software can query any MIB in much the same way that a database application can query any SQL server.

VIRUS WATCH

Current viruses, Trojan horses, and worms affecting the Macintosh community.

HC

Type: Data virus
First listed in Virus Watch: 6/91
Info: Infects HyperCard stacks.
Impact: Causes the Mac to hum oddly. At press time *Macworld* did not know if HC is destructive.

nCAM

Type: Virus
First listed in Virus Watch: 5/91
Info: An nVIR clone.
Impact: Nondestructive; infects applications and system files; can cause crashes.

MDEF D

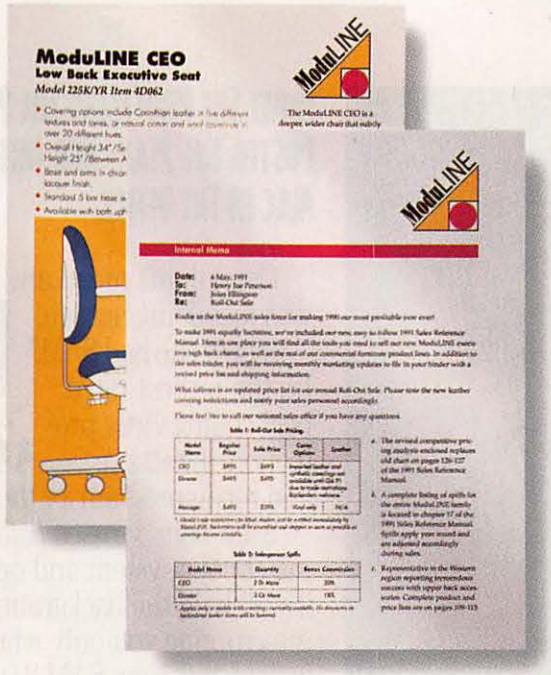
Type: Virus
First listed in Virus Watch: 5/91
Info: Infects applications and system files.
Impact: Nondestructive; can cause crashes.

Frame Maker. The most comfort



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FrameMaker's integrated table editor lets you easily create detailed tables with straddled cells, graphics, unlimited paragraphs, and rotated text within cells.



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Circle 60 on reader service card

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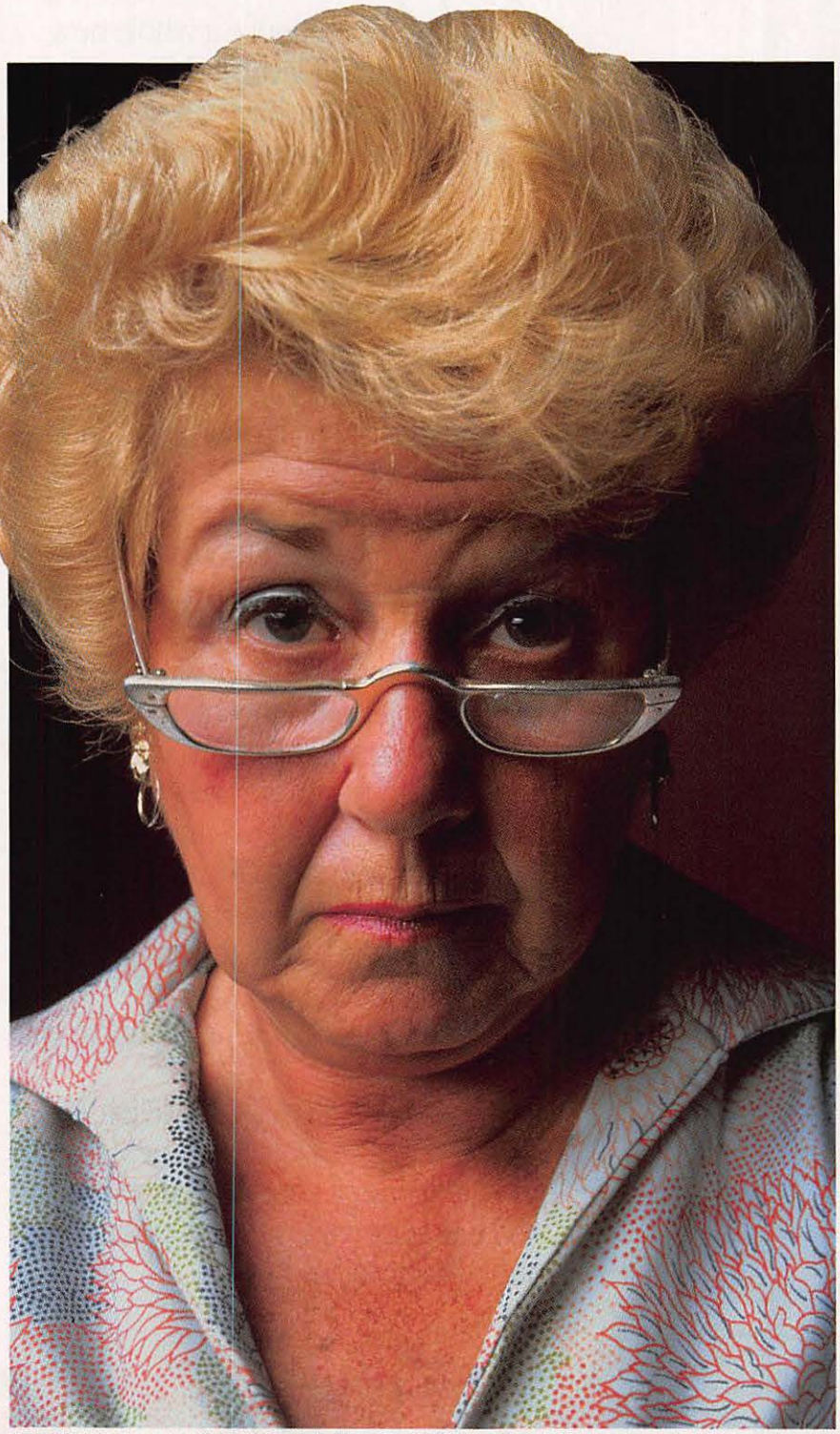
▶ And of course, it's compatible with System 7.0.

▶ So call 1-800-U4-FRAME ext. 955 for a free trial version of FrameMaker 3.0 and the name of your nearest reseller. And feel how comfortable a position in publishing can be.

Frame™

— SAM 3.0 protects the innocent from Macintosh viruses. —

TYPHOID CAROL.



TODAY SHE PROCESSED THE PAYROLL, POSTED THE MAIL, AND INFECTED EVERY MAC IN THE OFFICE.

Carol didn't mean any harm, she was just doing her job.

If only she had SAM.™ It's the highest rated, best-selling virus protection, detection, and repair program for the Macintosh.

MacUser
1989 MacUser Eddy Award Winner

SAM halts viruses *before* they infect your system and operates invisibly in the background—interrupting you only when a virus is detected. New SAM 3.0 even repairs infected desktop files automatically, no questions asked.

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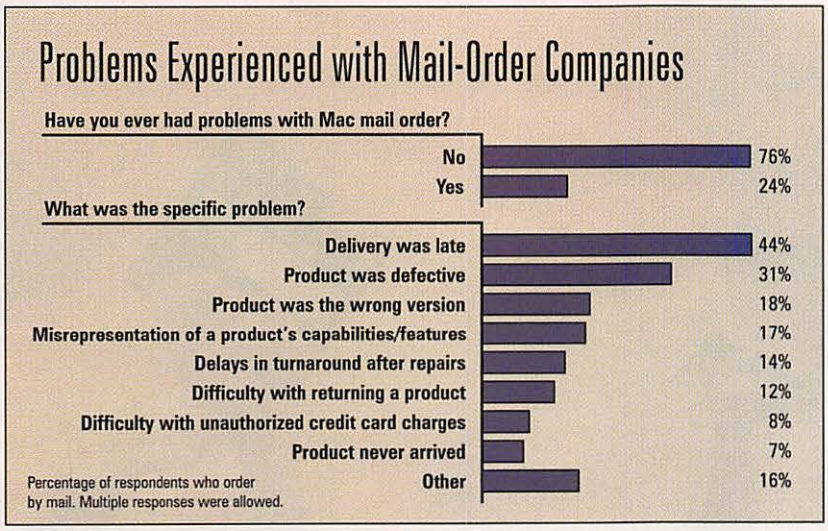
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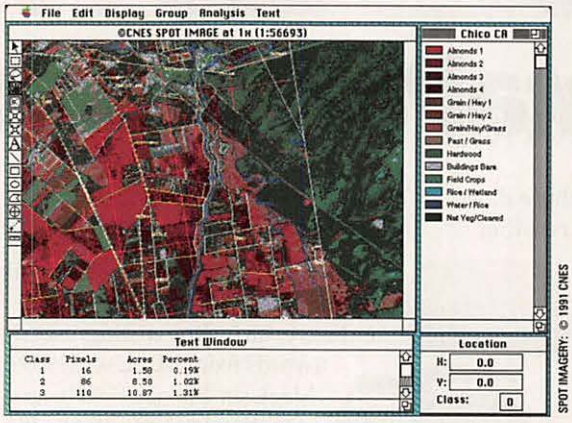
Twenty-four percent of surveyed readers who bought Mac products by mail report that they had problems with a transaction. The most frequent difficulty was late delivery.

Survey: Mail Order

For this month's survey we asked readers about their experiences ordering Mac products by mail. A very high 85.1 percent of 457 responding readers say they have bought Mac-related products from a mail-order company. Software is the most popular category among those readers, with 93.6 percent saying they have purchased Mac software through the mail. Another 62.5 percent say they have requested supplies, 53 percent have chosen Mac peripherals, and 4.4 percent say they have bought Macintosh computers through the post. The figures add up to more than 100 percent because multiple responses were possible.

A smaller number of respondents, 67 percent, say that their organization has purchased a Mac-related product through the mail, 24 percent say their organization has not, and 9 percent did not answer the question. Of individual respondents who have purchased Mac-related products in the past 12 months, 29.8 percent have done so one or two times, 26.2 percent have bought three or four times, 34.4 percent have ordered five to ten times, and 9 percent say more than ten times.

The average delivery time was 5.1 days, with 15.4 percent of buyers saying their package usually came in 1 day, 29.3 percent saying 2 days, 21.3 percent saying 3 to 4 days, 22.6 percent saying 5 to 10 days, and 9.8 percent saying delivery took longer than 10 days. Support from mail-order companies is generally well rated: 16.5 percent of customers say support was excellent, 41.1 percent call it good, 13.1 percent say it was fair, and 4.1 percent label it poor. Another 25.2 percent say they do not know how good the technical support was.—**T.M.**



A satellite image of Chico, California, edited in GAIA to highlight crop types. Roads and railways appear in white.

The Big Picture

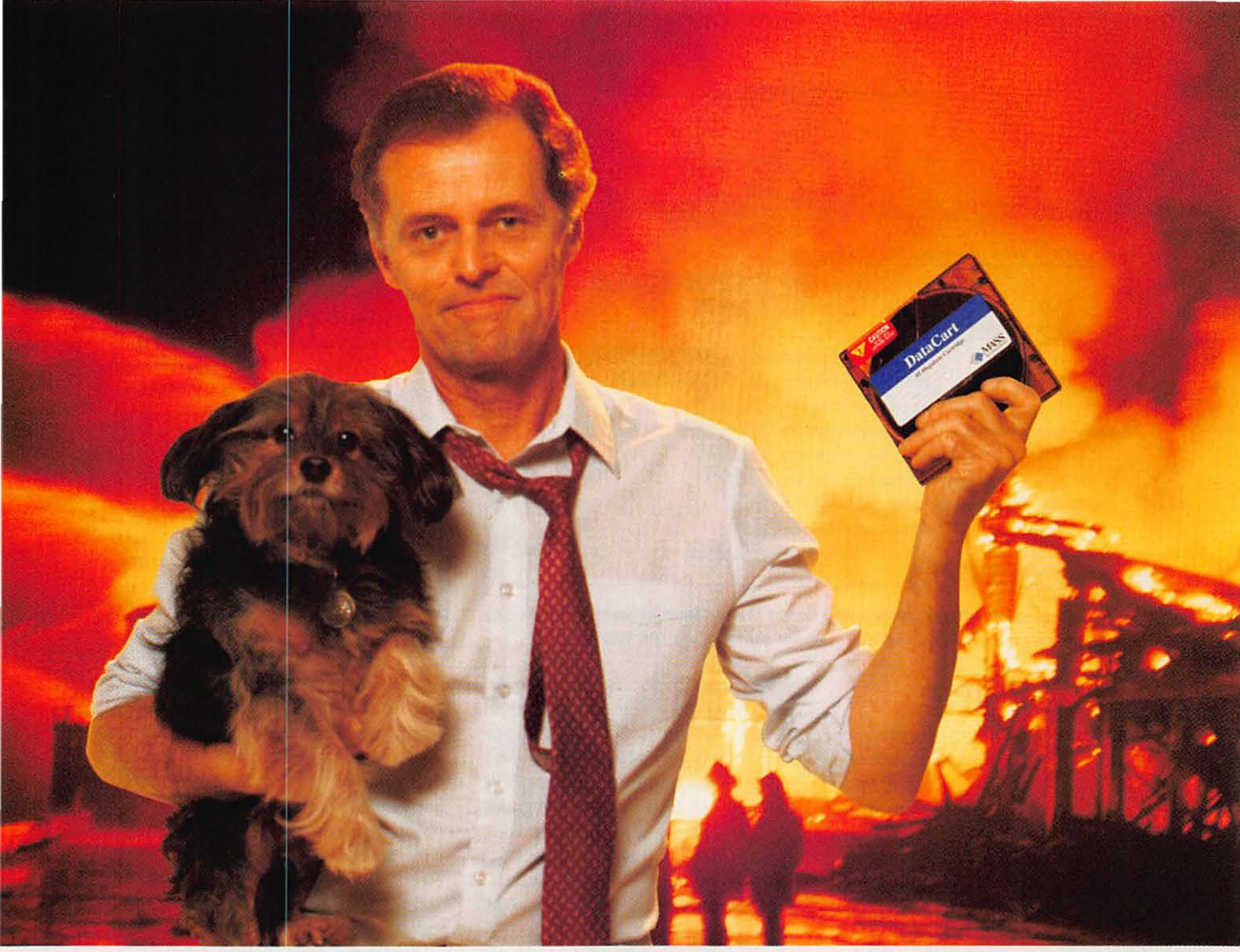
Environmentalists often play the role of David fighting the Goliaths of big corporations, government bureaucracies, and large-scale developers, who can devote great resources to gathering information that supports their case. Ecologist Richard Podolsky hopes that his GAIA (Geographical Access Information and Analysis) will help even the odds.

Until recently, only specialists using mainframes could analyze satellite imagery, but now environmentalists using GAIA on color Macs can quickly analyze satellite imagery to identify wildlife habitats, wetlands, and various types of forests. After converting satellite data to Mac format, Podolsky associates the images' colors with habitats, loads his Mac and a portable power supply into a van, and sets out to "ground-truth" his work.

Apple gave Podolsky a grant to develop GAIA with programmer Bill Shelley; Philip Conkling, executive director of the Rockland, Maine, Island Institute; and other colleagues at the nonprofit institute, which is devoted to the balanced use of Maine's 3000 coastal islands. "Maine has some of the last undisturbed wilderness in the Northeast," Podolsky says. "It still has a chance to avoid the mistakes made everywhere else." With GAIA, planners and environmentalists summon up color satellite images of the coast with a few keystrokes. With a few more, they zoom in for close-ups of islands, marshes, and forests, or agricultural, residential, and industrial areas. By overlaying vector-based maps of roads, political boundaries, property lines, and topography, researchers can study communities and their environments.

The Island Institute, with the Vermont Natural Resources Council, is also using GAIA to monitor deforestation in northern New England. Anyone analyzing the surface of the earth can use GAIA, including cartographers, geologists, agronomists, foresters, and educators.

Podolsky hopes to establish a distributor for GAIA soon. It now sells for $500 to schools, nonprofits, and government agencies, and for $1500 to commercial users. For further information, contact Richard Podolsky at 300 W. 23rd St., #10D, New York, NY 10011.—**Ann Garrison** M



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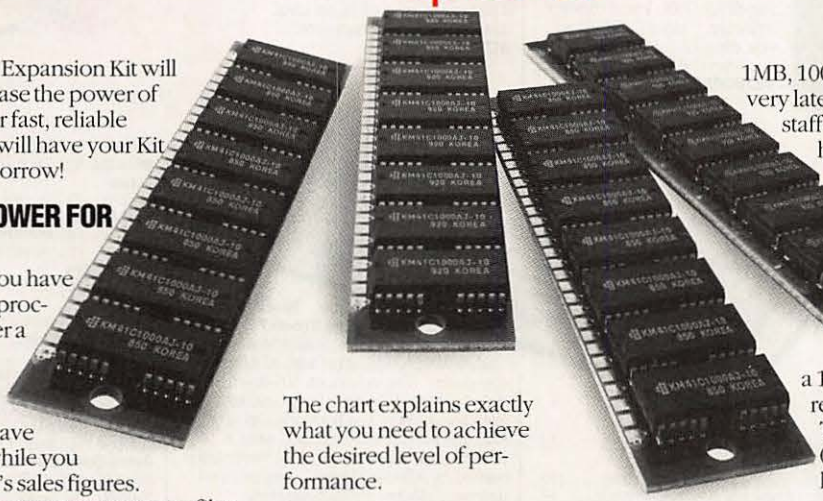
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Tomorrow's Upgrade For Your Mac Is Only $59*

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A MacWarehouse Expansion Kit will dramatically increase the power of your Mac. And our fast, reliable overnight service will have your Kit in your hands tomorrow!

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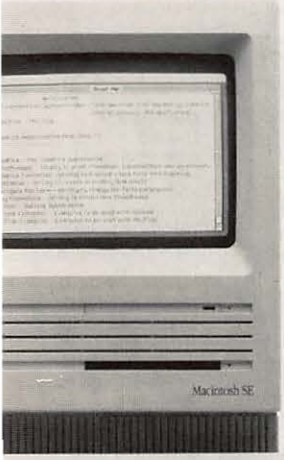
Never again will you have to quit your word processor just to answer a question about a spread-sheet. Install extra memory and you can leave your letter open while you refer to last month's sales figures. You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at your fingertips.

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WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs - (2 @ $59 ea.).



The chart explains exactly what you need to achieve the desired level of performance.

To upgrade a 4-socket Mac Plus or SE to this amount of memory.	Do this: (Install in multiples of two only)
2 MB	Remove all four existing 256K SIMMs, install two 1 MB SIMMs, leave two sockets for future expansion.
2-1/2 MB	Remove only two 256K SIMMs, install two 1 MB SIMMs.
4 MB	Replace all four 256K SIMMs with four 1 MB SIMMs.
To upgrade an 8-socket Mac II, IIx, IIcx, oe SE 30 to this amount of memory.	**Do this: (Install in multiples of four only.)**
4 MB	Remove all four existing 256K SIMMs, install four 1 MB SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256K SIMMs, install four 1 MB in remaining sockets.
8 MB	Remove all four 256K SIMMs, install eight 1 MB SIMMs.

To open your Mac Plus or SE, you'll need a specially designed tool - it's available from us as part of a handy tool kit for just $9.

WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMS (Single Inline Memory Modules). Each one megabyte SIMMS card holds eight top quality, memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung. We also carry the full line of Dove memory products.
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If, for any reason, you are dissatisfied with your MacWAREHOUSE Memory Kit, you may return it for a full refund within thirty days of purchase. All you have to do is call us for a return authorization number and return this product, postage paid, in its original condition, with the original packaging and documentation.
ONE YEAR WARRANTY. MacWarehouse also guarantees its Memory Kits against manufacturer defects for one year from the date of purchase. We will repair the item or replace it at our discretion.

* SIMMs prices vary. Call for latest information.
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❼ The perfect choice for powerful yet compact Mac communication. This 2400 baud modem with MNP5 data compression packs Hayes compatibility and error-free communication. TelePort plugs into your mouse (ADB) port and provides a pass-through connector for other devices. It uses no external power supply, and leaves your serial port free for other uses! **MOD0049 $145.**
❼ Also, TelePortFAX includes SendFAX 9600 baud modem software. Hold OPTION as you drag FILE-PRINT to easilysend FAXes worldwide. **MOD0058 $185.**

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Perform goal seek analysis, automatically link and consolidate worksheets, and produce stunning output in seconds with Excel 3.0, the most powerful analytical tool for the Macintosh. Achieve high-performance spreadsheet capabilities along with charting, database, and custom development tools created for the novice and power user alike. Features unparalleled power, advanced analytical and charting tools, and easy database access all in an ideal development environment. **BUS0167. $309.**



System 7 Compatibility: ❼ indicates that the product will run under System 7.

ACCESSORIES

Toner Cartridge
LaserWriter II ..... 105.
Basic Needs, Inc.
ACC0356 Dust Cover - Mac II & Extended Keyboard (grey nylon) ..... 17.
ACC0348 HardTops ImageWriter II Cover ..... 17.
ACC0347 HardTops Mac Extended Keyboard Cover 16.
ACC0346 HardTops Mac Standard Keyboard Cover 15.
ACC0466 MacIIcx/ci Monitor Stand ..... 49.
ACC0351 Utility Pac ..... 15.
B.A.S.F. (BASF)
MED0030 Disks - DS/HD 1.44 Meg (box of 10) ..... 22.
MED0029 Disks - DS/DD (box of 10) ..... 12.
Curtis
ACC0469 Command Center ..... 89.
Ergotron
ACC0344 MacTilt II - 13" Color RGB ..... 75.
ACC0128 MacTilt Plus/512 - Platinum ..... 68.
ACC0009 MacTilt SE, SE/030 - Platinum ..... 68.
Famous Engineering Brand
DAC0038 DigiMatic 179
I/O Design, Inc.
ACC0028 MacLuggage™ Plus Carrying Case ..... 64.
ACC1070 MacLuggage™ SE Carrying Case ..... 75.
ACC0327 Monitorware Apple RGB Case ..... 79.
ACC0427 Ultimate Classic/SE Ext. Carrying Case - Black ..... 79.
ACC0440 Ultimate Classic/SE Ext. Carrying Case - Navy ..... 79.
ACC0529 Ultimate Classic Carrying Case - Black .. 79
ACC0528 Ultimate Classic Carrying Case - Navy ... 68.
Kensington
ACC0459 Maccessories SE Radiation Anti-Glare Filter ..... 52.
ACC0097 System Saver Mac - Platinum ..... 63.
Mobius Products
ACC0055 Fanny Mac QT ..... 55.
ACC0247 SE Silencer ..... 39.
PowerUser™
BND0013 PowerUser Carrying Case w/Free Cap .... 69.
Sony
MED0031 Disks - 1.44 Mb High Density (3.5) ..... 24.



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❼ Key Tronic's new MacPro Plus keyboard is compatible with all Macintosh computers. The enhanced 105-key layout includes Period/Comma lock capability, an interchangeable Caps Lock and Ctrl keys. Also, the connecting cable you need is offered at no extra charge. The keyboard is backed by a limited lifetime warranty and unlimited toll-free product support. Includes offer for Tempo II, a keyboard macro package from Affinity Microsystems a $149.95 value FREE! **INP0156 $145.**

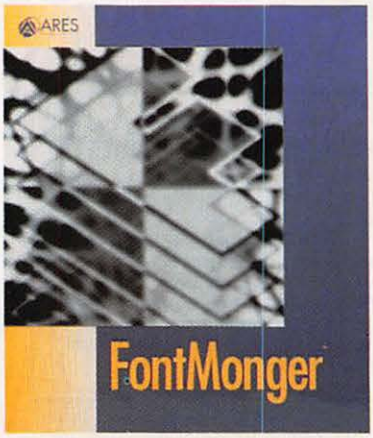
MED0003 Disks - DS/DD (box of 10) ..... 13.
Targus, Ltd.
ACC0438 MacIIcx/ci Carrying Case (black) ..... 79.
ACC0252 MacPlus/SE Carrying Case (black) ..... 69.
ACC0250 MacPlus/SE-Ext Keyboard Carrying Case 79.
ACC0591 Premier Classic Mac Plus/SE Carrying Case ..... 69.
ACC0482 Premier Leather Case ..... 185.

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Absolute Solutions, Inc.
❼FIN0086 Computerized Classic Accounting ..... 225.
Checkfree Corporation
❼FIN0088 CheckFree ..... 21.
Computer Associates
FIN0044 ACC PAC Bedford Simply Accounting 1.1 ..... 139.
Inman
FIN0013 Business Sense 1.4 ..... 129.
Intuit
FIN0130 Quicken 3.0 ..... 47.
Meca
❼FIN0039 Andrew Tobias' Managing Your Money 4.0 ..... 99.
Nolo Press
BUS0133 For The Record 2.0 ..... 32.
BUS0132 WillMaker 4.0 ..... 35.
Peachtree
❼FIN0059 At Once! 1.2 ..... 285.
Reality Technologies
❼FIN0068 WealthBuilder (Mac) ..... 99.
Softsync/BLOC Publishing
❼FIN0030 Accountant Inc. 2.0 ..... 179.
Teleware, Inc.
❼FIN0087 M.Y.O.B. 2.0 ..... 139.
TimeSlips Corp.
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Abacus Concepts
❼STA0006 MacSpin 3.0 ..... 185.
❼STA0008 StatView II 1.03 ..... 309.
❼STA0010 StatView SE+Graphics 1.03 ..... 199.
❼STA0022 SuperANOVA (MacII Family) ..... 309.
Acius
DAT0045 4th Dimension 2.1 ..... 489.
AEC Management Systems
BUS0129 FastTrack Schedule 1.5 ..... 139.
DAT0055 AEC Information Manager ..... 409.
After Hours
❼DAT0076 TouchBASE ..... 89.
Aldus
BUS0066 Persuasion 2.0 ..... 329.
ASD Software, Inc.
BUS0134 Planisoft ..... 195.
BUS0146 Planisoft - 5 pack ..... 579.
BUS0147 Planisoft - 10 pack ..... 839.
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DAT0042 dBase Mac ..... SPECIAL! 59.
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ACC0489 MacLabelPro ..... 49.
ACC0589 1st Impression: The Desktop Bindery ... 299.
ACC0590 1st Impression First Pack ..... 79.
Baseline Publishing
BUS0149 1 Shot Worksheet ..... 56.
Casady & Greene, Inc
DAC0010 QuickDex ..... 36.
CE Software
BUS0135 Alarming Events ..... 85.
❼GRA0070 CalendarMaker 3.0 ..... 31.
Claris
❼DAT0064 FileMaker Pro ..... 215.
❼BUS0058 MacProject II 2.1 ..... 359.
❼BUS0065 SmartForm Designer ..... 289.
DeltaPoint, Inc.
❼BUS0099 DeltaGraph 1.5 ..... 129.
WRD0048 TASTE/ UltraPaint Bundle ..... $79.
Fisher Idea Systems
BUS0168 IdeaFisher ..... 389.
BUS0169 Strategic Planning Module ..... 65.
Fox Software
DAT0047 FoxBase+/Mac 2.0 ..... 292.
Informix
BUS0064 Wingz 1.1 ..... 245.
JAM Software
DAC0032 Smart Alarms 3.0 (Single User) ..... 64.
DAC0033 Smart Alarms 3.0 (1-4 users) ..... 125.



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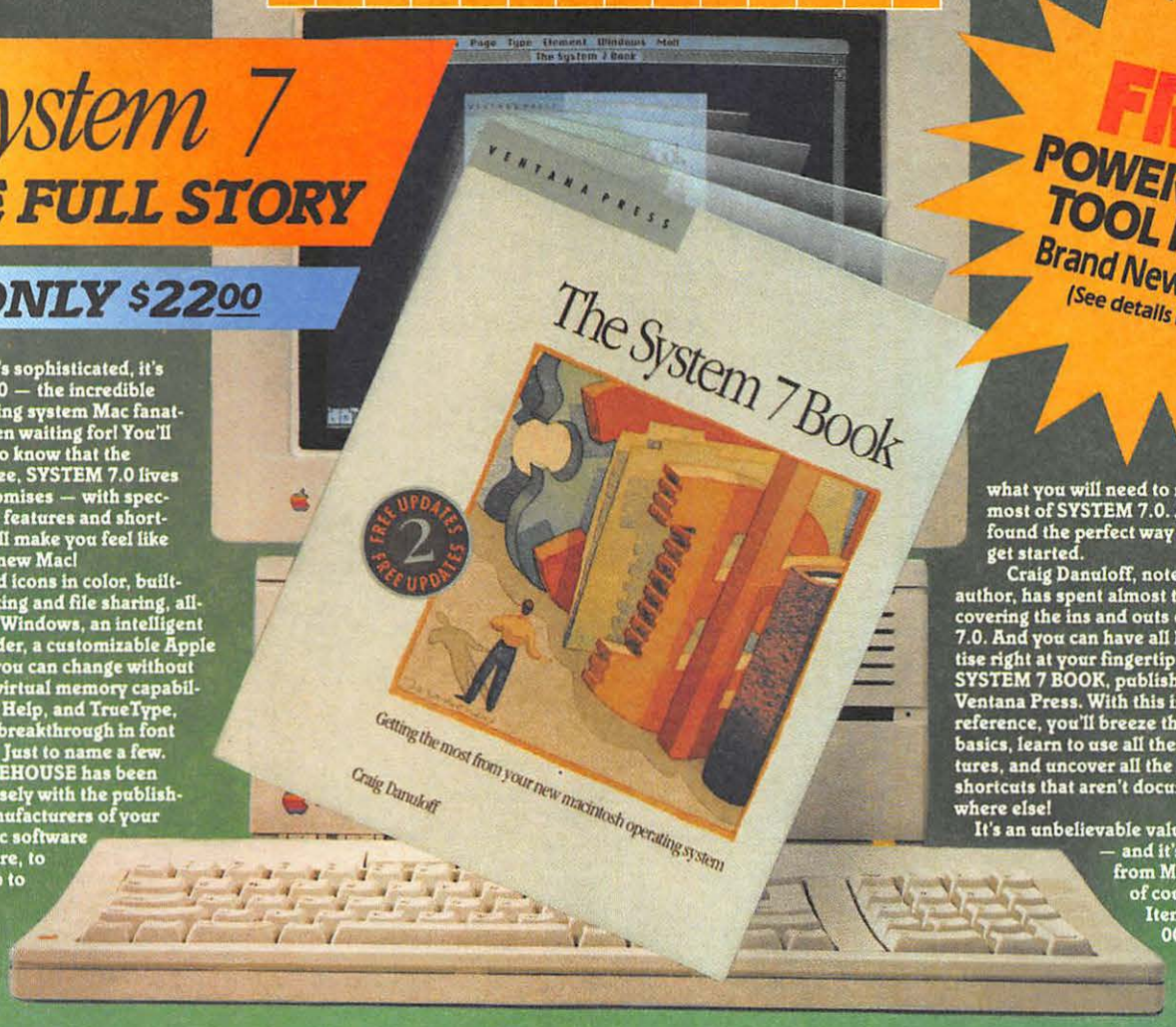


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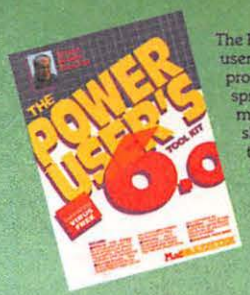
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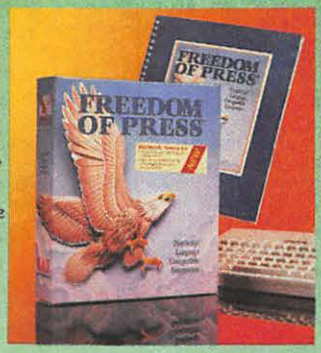
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Turn your entire AppleTalk network into a single, large capacity server. This virtual server runs in the background and uses the hard disks on each Mac and PC as part of its storage system. DataClub manages these distributed files as if they were on one hard disk. Each user sees the same file directory and can access it by clicking on the DataClub volume icon., You can add and remove Macs at any time without disrupting DataClub. Each connected Mac must have at least 2 MB and a hard disk drive. **NET0129 $119.**



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The all-in-one configuration and troubleshooting utility created to resolve hardware and software system conflicts. Standard features include: General System Information: CPU type, memory size, available slots and disk drives, Installed Devices: driver status, learn slot numbers and type, Parameter Settings: view current RAM setting, learn start up disk preference, serial port settings, Appletalk nodes and key rate thresholds. **UTI0218 $89.**

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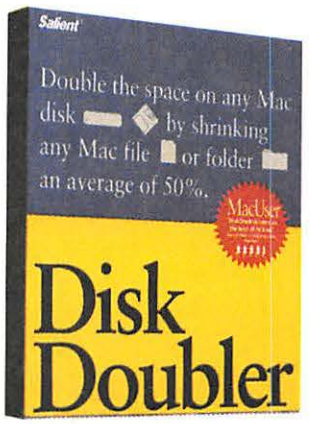
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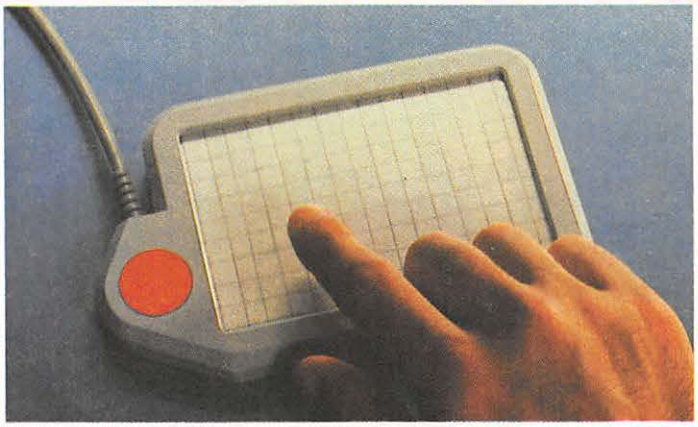


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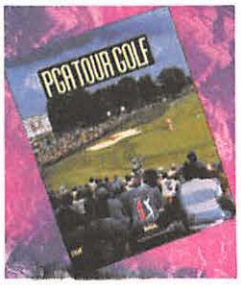




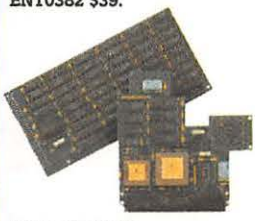
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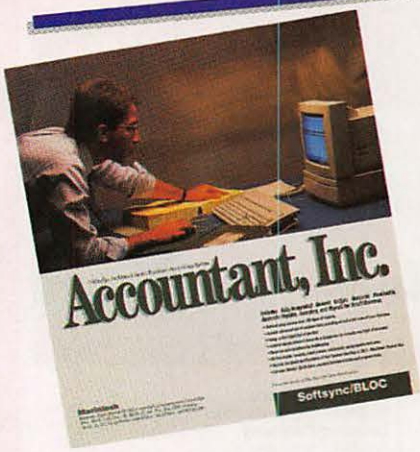
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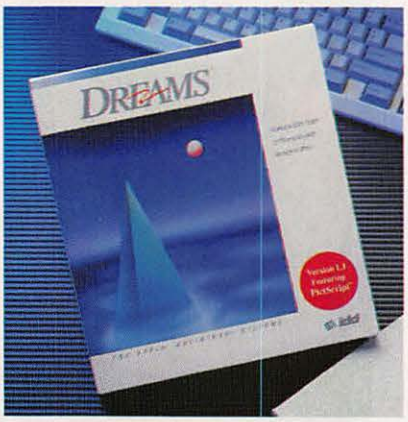


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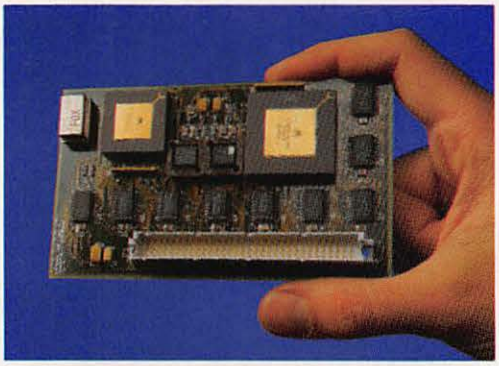
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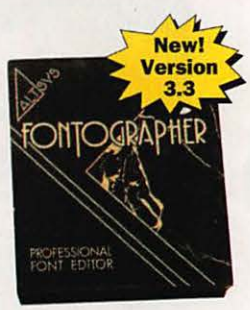
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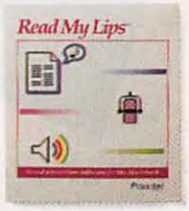




Fontographer 3.3
Creates, opens, and edits downloadable PostScript fonts in Type 1, Type 3, and Truetype formats. The fonts can contain standard alphanumeric characters, foreign characters or pictograms, icons, and logos.
FON0014 $269.



Lightning Scan 400
The fastest, most powerful hand-held scanner. Scans any flat surface instantly. Includes ThunderWorks software for full-page scanning and a DA for scanning in any program. Rated tops by Macworld, MacUser, Publish, and Personal Publishing. **INP0116 $385.**



Read My Lips
Attach sounds to documents you create using popular word processors, desktop publishing, and presentation software. Use pre-recorded sounds or record your own. Both the built-in microphones of the new Macs as well as MacRecorder are supported. **UTI0211 $75.**

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Complete Undelete (Microcom)
A quick, reliable, convenient method for recovering TRASHed files, even after the trash has been emptied. Maintains a "delete-log" of files thrown in the trash for instant review. **UTI0140 $49.**

Virex 3.0
The first comprehensive solution to the threat of computer viruses. Prevents, detects and repairs files infected by all known Macintosh viruses. **UTI0093 $59.**

911
❼ Problem recovery package which incorporates an extensive troubleshooting reference guide and a collection of powerful utility programs that allow you to recover data from damaged disks or files. **UTI0191 $89.**

ClickArt Color (T/Maker)
ClickArt Color Graphics for Presentations is a portfolio of more than 250 high-quality, full color images created especially for presentation. The images have been designed to deliver quick, clean, visual impact against the colored backgrounds typically used in presentations. The subject categories are appropriate for any type of business presentation and include time and money icons, people in office-related situations, maps, computers, flags, backgrounds, and logos, to name a few. **GRA0272 $99.**





ProModem Ultima
Only 14,400 bps modem with Fax! Supports the new V.32bis standard for 14,400 transmissions plus V.42bis/MNP-5 compression and error correction. Also, a 9600 bps Send/Receive Fax with feature-filled Maxfax softwar. Includes MAcKNOWLEDGE software and cable. **MOD0064 $699.**



NewsletterMaker Vol.1

Metro ImageBase Electronic Clip Art
Communicate more effectively with fabulous art and graphics from the world's largest publisher of clip art. Each of the 18 ImageBase packages contains at least 100 topic-related images drawn by professional artists. **GRA0169 $85.**



Offline 2.0
The complete disk management system isn't just for floppies anymore! Catalogs hard drives, Syquest cartridges, even CD ROMs. Quick and flexible search engine lets you find any file on any disk, even if it's not mounted. Prints disk labels and exports to other applications. **UTI0207 $65.**

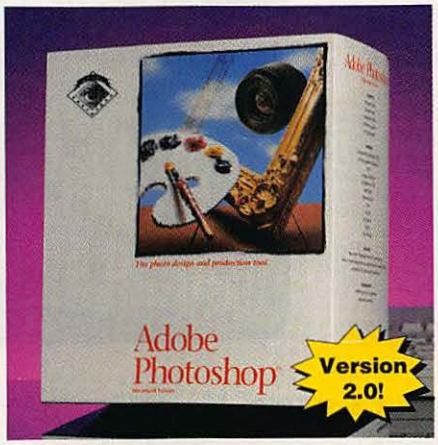
Farallon™ Computing
GRA0221 MediaTracks™ ..... 219.
GRA0222 MediaTracks™ Multimedia Pack ..... 369.
Graphsoft
❼CAD0024 Blueprint ..... 219.
❼CAD0030 MiniCAD+ 3.0 ..... 595.
Innovative Data Design
CAD0039 MacDraft 2.1 ..... 279.
GRA0104 Dreams 1.1 ..... 419.
Letraset
❼GRA0151 ColorStudio ..... 599.
DTP0019 ImageStudio 1.5 ..... 139.
MacroMind
GRA0140 MacroMind Director 2.0 ..... 629.
❼Metro Image Base (Full line available)
GRA0169 Newsletter Maker ..... 85.

Epson
INP0167 Epson EPL-7500 Laser Printer ..... 2599.
INP0168 Epson EPL-7000 Laser Printer ..... 999.
INP0173 Epson PostScript Kit ..... 1599.
Seikosha
INP0041 Seikosha SP 2000 AP Printer ..... 235.
Sharp
COMP007 Wizard OZ 7000 (32KRam) ..... 229.
COMP018 Wizard OZ 7200 (64KRam) ..... 255.
ThunderWare
INP0116 LightningScan 400 ..... 385.
INP0007 ThunderScan Plus ..... 199.

INPUT & OUTPUT

Abaton
❼INP0157 Scan 300/Color ..... 1899.
INP0164 LaserScript Printer LX ..... 1759.

Photoshop 2.0 (Adobe Systems)
Get direct access to an even wider selection of color editing and production capabilities. View and edit high-resolution CMYK color scans directly on screen without changing the RGB of the monitor. Photoshop the all-in-one professional prepress, color correction, paint, video editing and darkroom system allows one seamless creation in 24-bit color or black and white. New key features include a Bezier selection tool and duotone images. **GRA0191 $569.**



Koala
INP0127 MacVision 3.0 ..... 269.
Kraft
INP0094 Kraft ADB Trackball ..... 79.
Microspeed
NP0126 MacTRAC ADB ..... 75.
INP0140 MacTRAC DB9 ..... 62.
Microtek
INP0112 Microtek MSF-300ZS Scanner ..... 1998.
INP0176 ScanMaker 1850 S ..... 2459.
INP0162 TrueLaser Printer ..... 2019.
MicroTouch
❼INP0084 The UnMouse ..... 189.
Mouse Systems
❼INP0132 Little Mouse ADB ..... 75.
❼INP0134 Trackball / ADB ..... 69.
Sophisticated Circuits
ACC0535 Power Key ..... 64.
ThunderWare
INP0116 ThunderScan 400 ..... 385.

MEMORY UPGRADES & ACCELERATORS

Connectix
UTI0144 Virtual 030 2.0 UM3 ..... 113.
DRI0185 Virtual 2.0 PMMU ..... 188.
Daystar Digital
❼DRI0224 64K FastCache IIci ..... 289.
❼DRI0288 40 MHz PowerCache (IIci) ..... 979.
❼DRI0290 50 MHz PowerCache (IIci) ..... 1699.
PowerCard 030 (II,IIx,IIcx) . starting at 1495.
Dove
❼DRI0130 MaraThon 030 (MacII) ..... 599.
❼DRI0198 MaraThon 030 - (Mac SE) ..... 399.
❼DRI0197 MaraThon 030 - (MacPlus) ..... 399.
❼DRI0152 MaraThon 030X (MacIIx) ..... 599.
❼DRI0151 MaraThon 030-SE/030 ..... 599.
❼DRI0380 Marathon Racer For Mac II ..... 1079.

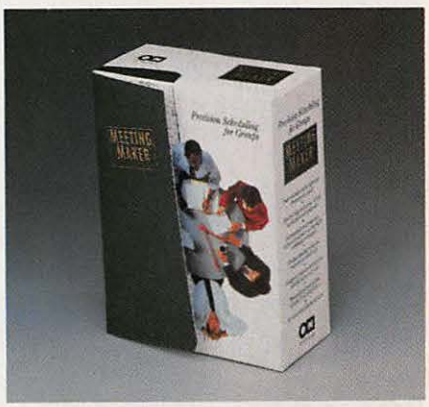
Paracomp
GRA0235 FilmMaker ..... 435.
GRA0233 Swivel 3D Professional ..... 435.
GRA0234 SwivelArt ..... 81.
Praxitel
UTI0211 Read My Lips ..... 75.
Silicon Beach
GRA0092 Digital Darkroom 2.0 ..... 259.
GRA0131 Super 3D 2.1 ..... 329.
HYP0027 SuperCard 1.5 ..... 199.
GRA0112 SuperPaint 2.0 ..... 135.
Solutions, Inc.
DAC0002 SmartScrap & The Clipper 2.01 ..... 56.
Strata
GRA0176 StrataVision 3D 2.0 ..... 349.
Strategic Mapping, Inc.
GRA0227 Atlas MapMaker 4.5 ..... 369.
SuperMac
GRA0253 PixelPaint 2.1 ..... 162.
❼GRA0249 PixelPaint Professional 2.0 ..... 519.
Tactic
GRA0110 ArtClips 1st Edition ..... 49.
GRA0160 ArtClips 2nd Edition ..... 65.
T/Maker Co.
GRA0039 ClickArt Business Image ..... 32.
GRA0088 ClickArt EPS Illustrations ..... 82.
GRA0272 ClickArt Color ..... 99.
Zedcor
❼GRA0199 DeskPaint 3.3 ..... 113.

HARDWARE & PERIPHERALS

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INP0143 Typist ..... 479.
CoStar
INP0091 LabelWriter ..... 185.

Applied Engineering
INP0148 Quadralink ..... 209.
Articulate Systems
INP0160 Voice Navigator II ..... 559.
CH Products
INP0121 RollerMouse ADB ..... 75.
Curtis
INP0141 MVP Mouse ..... 89.
Datadesk International
INP0174 Mac101E Keyboard ..... 129.
Digital Vision, Inc.
GRA0145 Computer Eyes B & W ..... 199.
GRA0154 Computer Eyes For Mac-Color ..... 349.
ICD
INP0095 Graflex ..... 82.
Kensington
NP0059 Turbo Mouse ..... 109.
INP0060 Turbo Mouse ADB (SE or II) ..... 109.
Key Tronic
❼INP0156 MacPro Plus ..... 145.

Meeting Maker (ON Technology, Inc.)
A Macintosh network application that helps you plan,schedule and confirm meetings. You can schedule a time and date, select required guests, reserve rooms and resources and prepare agendas. Meeting Maker also has a personal calendar that allows you to block out activities, meetings, private work sessions, even recurring weekly or monthly appointments in a single step. You can also print your calendar in popular day-planner formats. **5-User BUS0165 $299.; 10-User BUS0166 $559.**



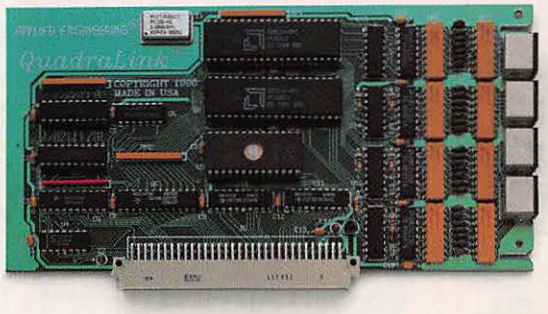


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SmartOne 2400/1200 (Best Data Products)
When you need a 2400 baud modem, the SmartOne 2400/1200 provides an economical alternative. For less than the cost of some 1200 bps units, you get a Hayes compatible modem with auto answer/originate, 300, 1200, and 2400 baud operation, pass-through phone jack, speaker with programmable volume, and a manufacturer's two-year warranty. All user options are stored in non-volatile memory. Includes free Quicklink II communications software, modem, cable, and **CompuServe/Prodigy Start-Up Kit** offer. **MOD0021 $139.**



QuadraLink (Applied Engineering)
QuadraLink solves the problem of clogged serial ports. Add four additional serial devices (printers, plotters, scanners, modems, etc.) to your Mac II. QuadraLink is compatible with Mac's Communication Toolbox, System 7.0 and includes a "shadow driver" to recognize older software. (Mac II family only) **INP0148 $209.**

Micron Technology
DRI0321 PicturePress Card (Xceed ICDP-II) ..... 745.
MicroTech International, Inc.
CHP0025 Mac Classic 1 Meg Upgrade ..... 79.
CHP0026 Mac Classic 3 Meg Upgrade ..... 179.
DRI0315 Mac Classic Upgrade Kit 20-1 ..... 399.
DRI0317 Mac Classic Upgrade Kit 40-1 ..... 499.
DRI0318 Mac Classic Upgrade Kit 40-3 ..... 575.
PowerUser™
❼CHP0013 1 Meg Simm 100ns PowerUser ..... 59.
Total Systems
DRI0295 Mercury 16MHz 68030 - Plus ..... 519.
DRI0297 Mercury 16MHz 68030 - SE ..... 389.
DRI0299 Mercury SCSI Module - Plus ..... 209.

MODEMS & FAX

Abaton
MOD0019 InterFax 12/48 ..... 265.
MOD0034 InterFax 24/96 ..... 349.
Applied Engineering
❼MOD0054DataLink/Mac ..... 209.
Best Data
MOD0021 SmartOne 2400/1200 ..... 139.
Dove
❼MOD0038 DoveFax Desktop ..... 299.
❼MOD0053 Dove Fax Plus ..... 359.
Global Village
❼MOD0049 TelePort 2400 ADB Modem ..... 145.
❼MOD0058 TelePort/Fax 9600 ..... 185.
Hayes
COM0023 Smartmodem 2400 ..... 349.
MOD0017 Smartmodem 9600 (V series) ..... 589.
MOD0060 Personal Modem 2400 w/Smartcom II ..... 179.
MOD0059 Ultra 96 w/ Smartcom II ..... 799.
Microcom
MOD0050 MacModem V.32 / 9600 ..... 689.
PowerUser™
MOD0043 2400 BPS Mini Modem ..... 99.
MOD0047 Mini Send Fax 2400/9600 ..... 149.
MOD0062 24/96 Mini Send/Receive Fax Modem ..... 199.
Prometheus
MOD0052 9600M Plus Modem ..... 599.
MOD0046 ProModem 24/96 MSR ..... 299.
MOD0033 ProModem 2400 MFax ..... 209.
MOD0064 ProModem Ultima ..... 699.
MOD0035 TravelModem ..... 199.
Shiva
NET0067 NetModem V.32 (9600) ..... 1169.
Supra Corporation
MOD0020 SupraModem 2400 ..... 119.

Puzzle Master (Centron Software)
Now you can use your Mac to solve crossword puzzles, or create your own puzzles for fun or profit. Puzzle Master includes 250 of the classic New York Times puzzles, 200 Daily puzzles and 50 Sunday puzzles. No more erasing or scratching out changes! Built-in timer and scoring system allows you to test your skill against the experts. Get optional hints and answer checks if you get stuck. Save partial solutions, print puzzles, answers, clues. **ENT0383 $29.**



SECURITY & VIRUS PROTECTION

ASD Software, Inc.
UTI0135 FileGuard 2.5 ..... 139.
UTI0130 FileGuard 2.5 - Office Pack 5 ..... 499.
UTI0131 FileGuard 2.5 - Office Pack 10 ..... 799.
ACC0539 MaccessCard Reader ..... 299.
Fifth Generation System
❼UTI0120 DiskLock ..... 118.
Kensington
ACC0235 Apple Security Kit ..... 34.
PassProof ..... 69.
Kent Marsh
❼UTI0028 MacSafe II ..... 107.
❼UTI0064 NightWatch 1.03 ..... 86.
Magna
UTI0166 Empower I ..... 89.
UTI0146 Empower II ..... 155.
Microcom
❼UTI0093 Virex ..... 59.
❼UTI0150 Virex 10-pack ..... 359.
Symantec Corporation
❼UTI0214 Symantec Antivirus for Mac 3.0 (SAM) ..... 65.

UTILITIES & PROGRAMMING

Abbott Systems, Inc.
❼UTI0113 CanOpener ..... 62.
Advanced Software
UTI0192 Intouch ..... 39.
Affinity
❼UTI0198 Tempo II Plus ..... 105.
Aladdin Systems
UTI0145 StuffIt Deluxe 2.0 ..... 62.
ALSoft
UTI0132 DiskExpress II 2.03 ..... 55.
UTI0110 MasterJuggler 1.5 ..... 55.
Baseline Publishing
UTI0187 INIT Manager ..... 34.
UTI0190 Personality ..... 49.
UTI0183 ScreenShot ..... 34.
Berkeley System Design
❼UTI0119 After Dark 2.0 ..... 29.
UTI0074 Stepping Out ..... 55.
CE Software
❼UTI0188 Quickeys 2 v.2 ..... 97.
Connectix
UTI0148 HandOff II 1.1.3 ..... 56.
Custom Applications
❼UTI0136 Freedom of Press 3.0 ..... 255.
❼UTI0185 Freedom of Press Light 3.0 ..... 55.
Dantz Development
❼UTI0118 Retrospect 1.2 ..... 148.
❼UTI0196 Retrospect 1.2 Remote ..... 275.
Dariana Software
UIT0218 MacSlueth ..... 89.

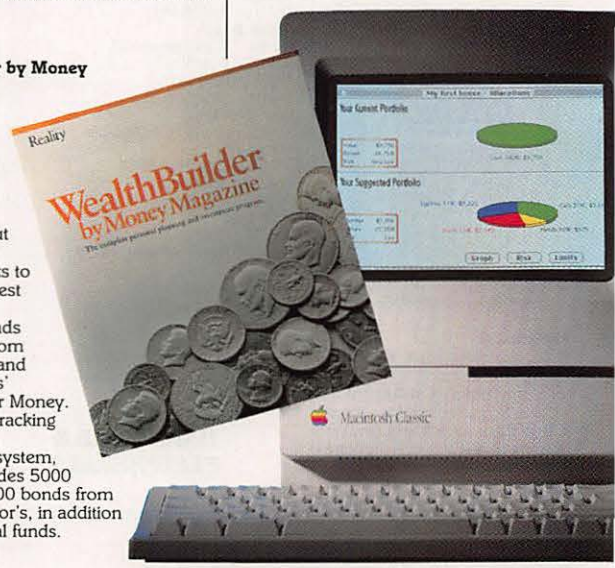
MUSIC & SOUND

Coda Music Software
MUS0044 Finale 2.6.1 ..... 549.
Electronic Arts
MUS0004 Deluxe Music Construction 2.5 ..... 85.
Farallon™ Computing
MUS0036 MacRecorder® 2.0 ..... 174.
Opcode Systems
MUS0083 MIDI Translator ..... 43.
Repertoire
MUS0034 Music Publisher ..... 359.
Tactic Software
Sound Clips Vol. 1, 2, 3 & 4 ..... ea. 49.



FontCard NTX (Sonnet)
A font expansion card for Apple's most powerful laser printer which adds the popular Adobe TypeSet 1, 2 and 3 PostScript language fonts to the LaserWriter IINTX. The card plugs directly into the font expansion connector on the NTX's controller board and becomes a resident part of the printer. The Sonnet FontCard NTX comes bundled with Adobe Type Manager software and Adobe TypeSet 1, 2 and 3 outline and bitmapped fonts for the Macintosh. **FON0410 $469.**

WealthBuilder by Money Magazine (Reality Technology)
❼
WealthBuilder uses your financial data and your decisions about goals and acceptable risks to calculate the best investment strategy. It reads data directly from both Quicken and Andrew Tobias' Managing Your Money. It has a stock tracking and portfolio management system, and now includes 5000 stocks and 5000 bonds from Standard & Poor's, in addition to 1450 mutual funds. **FIN0068 $99.**



CompuServe

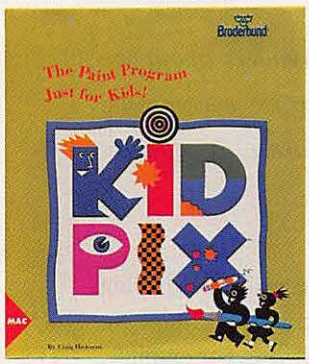
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Intouch
(Advanced Software)
MacUser Magazine rates Intouch "the best name-and-address DA for the Mac," (4 1/2 mice). Intouch is an easy-to-use Macintosh Desk Accessory that stores unlimited names, addresses, phone numbers and notes, prints envelopes and labels, dials telephone numbers and more! Because Intouch is a DA, it provides you with instant access to your data. Create multiple datafiles, store up to 14 pages of notes for each contact, and automatically time and date stamp your notes. Network 3-pak now available. **UTI0192 $39.**



Dubl-Click
UTI0194 ClickChange ..... 56.
Fifth Generation Systems
❼UTI0063 FastBack II 2.5 ..... 125.
❼UTI0087 SuitCase II 1.2.1 ..... 49.
UTI0035 SuperLaserSpool 2.02-Single User ..... 93.
ICOM Simulations, Inc.
UTI0084 On Cue ..... 35.
Insight Developement
UTI0098 MacPrint 1.2 ..... 95.
Kent Marsh
❼UTI0212 Folder Bolt ..... 73.
Magic Software
UTI0077 Autosave II ..... 26.

Kid Pix (Broderbund)
Kid Pix makes computer graphics fun. Designed for kids ages 3-12, it includes audio feedback and plenty of good humor. The pencil scratches, the brush bloops, and the moving tool that sounds like a truck engine. Children using a Mac with voice input can record personal messages that play back whenever they open their painting. The Tools include a palette of animated Wacky Brushes. The Rubber Stamp lets kids create frogs, birds and other creative illustrations with a mouse click. Imaginative erasers include a Black Hole and a Firecracker. **GRA0268 $29.**



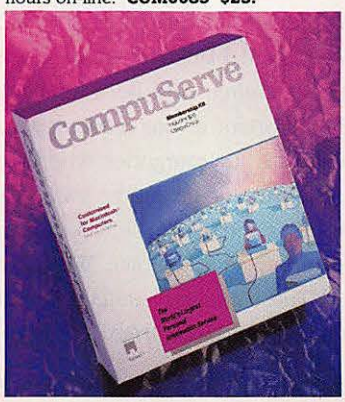
Mainstay
UTI0073 Capture 3.0 ..... 49.
UTI0189 MacFlow 3.5 ..... 169.
Microcom
❼UTI0191 Microcom 911 Utilities ..... 89.
UTI0140 Complete Undelete ..... 49.
Microsoft
LNG0030 QuickBASIC ..... 64.
Multi Ad Services
UTI0199 Multi Ad Search ..... 125.
Now Software
❼UTI0167 Now Utilities 2.0 ..... 79.
❼UTI0168 Screen Locker ..... 45.
ON Technology
UTI0142 ON Location ..... 75.
Salient
UTI0179 DiskDoubler 3.7 ..... 49.
SNA
UTI0207 Offline 2.0 ..... 65.
SuperMac
UTI0203 DiskFit 2.0 ..... 65.
Symantec Corporation
UTI0208 Master Finder ..... 49.
UTI0151 Norton Utilities for the Mac ..... 89.
UTI0078 Symantec Utilities for Mac II (SUM) ..... 96.
LNG0001 THINK's C 4.0 ..... 165.
LNG0002 THINK's Pascal 3.0 ..... 165.

Zedcor
LNG0031 ZBasic 5.0 ..... 99.

WORDPROCESSORS & SPELLING CHECKERS

Ashton-Tate
WRD0009 FullWrite Professional 1.1 ..... SPECIAL! 49.
Baseline
SPL0029 Thunder 7 ..... 56.
Caere
OmniDraft or OmniSpell ..... ea.69.
UTI0100 OmniPage 2.1 ..... 495.
Claris
❼WRD 0026 MacWrite II ..... 139.
DeltaPoint
❼WRD0048 TASTE ..... 79.
Deneba Software
SPL0015 Spelling Coach Pro. 3.1 ..... 124.
Microsoft
❼WRD0022 Word 4.0 ..... 245.
Paragon
WRD0029 Nisus 3.05 ..... 245.
Reference Software
❼SPL0023 Grammatik Mac 2.0 ..... 59.
Sensible Software
WRD0023 BookEnds 1.2 ..... 51.
SPL0018 Sensible Grammar ..... 51.
SNA, Inc.
WRD0033 Stylist ..... 51.
T/Maker Co.
WRD0018 WriteNow 2.2 ..... 119.
WordPerfect
WRD0041 WordPerfect 2.0 ..... 279.
WordStar
SPL0028 Correct Grammar 2.0 ..... 55.

CompuServe Membership Kit For the Macintosh
(CompuServe) The largest on-line data service, with over 500,000 users. Services include electronic mail, bulletin boards, special interest groups (Forums), and a discount department store. You can chat with other users in the CB mode, or check out the latest rumors in the gossip column. Databases include the complete text from major newspapers and encyclopedias, plus stock data, weather forecasts and book and movie reviews. The Membership Kit contains everything you need to get started, including credit against your first two hours on-line. **COM0085 $23.**



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(Cutting Edge)
New enhanced Cutting Edge drives deliver quiet, reliable memory with access times as low as 20ns. New features include two power outlet, 50-pin cables for easier daisy chaining, a quieter fan, dual-fuse surge buffer and simplified operation manuals. Available in 20 MB to 80 MB. **20MB Only $329, 30+MB Only $339, 45+MB Only $389, 60+MB Only $399, 80+MB Only $469.**

45MB Removable
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Includes all the features of the PowerUser 2400 BPS Mini Modem plus a powerful 9600bps send/receive fax to meet all your communication needs. Preview your fax on the screen, print it, delete it or forward it to another fax machine. Includes greyscaling to any Group III fax. All PowerUser modems come with a one year warranty. **MOD0062 Just $199.**

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All year long, we at Macworld work furiously to inform our readers about the expanding array of Macintosh products. But once each year we become the audience—actively soliciting your opinions about the hardware and software you consider to be the best—worthy of world-class recognition.

Expanding Market, Expanding Categories

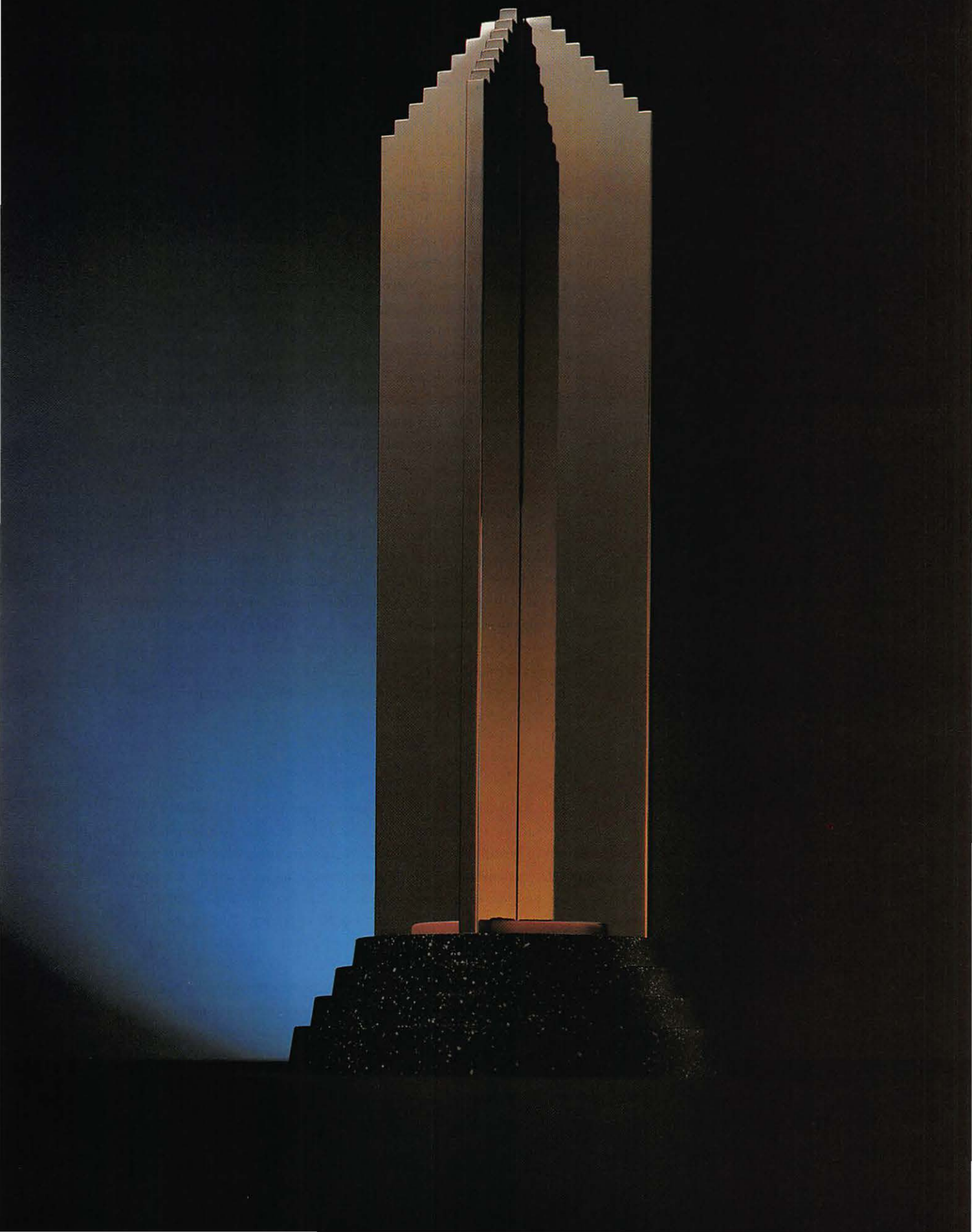
This year, to keep pace with the growing complexity of the Macintosh market, we decided to expand the number of categories—from 41 last year to 65 this year. For example, to reflect Macintosh users' growing need for mass storage, Optical Drive, Tape Drive, and Removable-Media Drive were added to the hardware list; Electronic Mail, OCR, and Image Processing—three applications gaining in popularity—joined the software group. We also divided many existing categories: hard drives fell into three groups: low, medium, and high capacity; and scanners into two: color and black-and-white. Statistics/Math became two separate categories as did Education/Training. And because good—and bad—customer support has become an increasingly important to our readers, we added that as a write-in category for both hardware and software. In categories where most vendors sell many similar models, we have listed only companies—giving the award to an entire product line.

We've displayed the winning products and listed the top runners-up; *Others* represents the total percentage of votes cast for products not shown. We also noted the total percentage of respondents in each category. These contest results reflect readers' preferences but should not be construed as endorsements by *Macworld*.

DAVID BISHOP

BY CATHY ABES

Mac products—according to you



Rising Stars and Perennial Favorites

Not surprisingly, we found many repeat winners, though a number of others found themselves squeezed out by some new contenders. Last year's Most Promising Newcomers, Hewlett-Packard's DeskWriter and Adobe Type Manager, both took top honors in their respective hardware and software divisions, although the DeskWriter did have to share its current title with Apple's ImageWriter II.

In Telecommunications, MicroPhone II edged past FreeSoft's White Knight (they tied last year), and surprisingly, The Norton Utilities for the Mac, which tied with Adobe Photoshop and Salient Software's DiskDoubler as this year's Most Promising Newcomer—Software, was also voted the best protection/recovery/backup utility, beating out last year's winner, SUM II. Speaking of Photoshop, Adobe's hot new product garnered perhaps the strongest vote of confidence, winning an impressive three awards. Not only did it sweep the Image Processing category but it knocked SuperMac's PixelPaint off the Color Paint pedestal as well. Too bad Adobe refuses to lower the price, but maybe this means it doesn't have to. And MacroMind Director, despite its high price and unnatural interface, handily won the Multimedia/Animation category; maybe it merits another look.

The hardware categories saw a few surprises as well. For the first time, Thunderware's ThunderScan lost out to the pricey Apple Scanner, placing a distant third while Hewlett-Packard's ScanJet Plus was close on Apple's heels. Another regular winner in the past—Kensington Microware's Turbo Mouse—was upset by the Apple Extended Keyboard II. And this year saw some upheaval in the storage categories: demonstrating how a small entrepreneur has managed to create something from nothing, La Cie tied with Apple for best mid-range hard drive and captured both the high-capacity hard drive and optical drive categories. Readers indicated their approval of Apple's new low-cost Macs—the LC and the IIsi—by locking them in a tie for Most Promising Newcomer—Hardware.

A BREAK WITH TRADITION

FOR THE FIFTH ANNUAL WORLD-CLASS CONTEST, WE SIGNIFICANTLY CHANGED THE WAY WE POLL OUR READERS. IN EACH OF THE PREVIOUS YEARS, AN ENTRY FORM WAS PUBLISHED IN THE FEBRUARY AND MARCH ISSUES OF *MACWORLD*, LISTING EACH PRODUCT CATEGORY. READERS WERE ASKED TO WRITE IN THE NAMES OF THEIR FAVORITE PRODUCTS, CLIP OUT THE FORM, AND SEND IT IN.

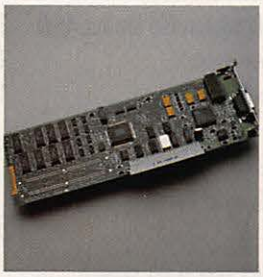
THIS YEAR, IN AN ATTEMPT TO REFINE OUR POLLING METHODS, WE CHOSE A NEW APPROACH: SENDING OUT A WORLD-CLASS PRODUCT SURVEY QUESTIONNAIRE TO A RANDOMLY SELECTED SAMPLING OF 4000 *MACWORLD* SUBSCRIBERS. THE SURVEY LISTED PRODUCTS TO VOTE FOR WITHIN EACH CATEGORY AND GAVE RESPONDENTS THE OPTION OF WRITING IN CANDIDATES THAT WEREN'T LISTED.

The Lucky Dozen

As always, a number of ballots were randomly chosen from those returned and each of the following twelve winners will receive a selection of World-Class hardware and software graciously donated by the winning vendors: *Larry R. Beach* of Des Moines, Iowa, a molecular biologist who does DNA analysis on the Mac; *Leigh Blair,* of Novato, California, who designs publicity materials for a service agency; *Earl Blankenship III* of Marion, Illinois, the only Mac user in his sales office; *Joe Brickham* of Fort Worth, Texas, a medical photographer who also runs his own desktop-publishing business; *Terry Ertter* of Phoenix, Arizona, who desktop-publishes his company's marketing publications; *David E. Gillis* of Pacific Palisades, California, who designs album pages for his stamp collection with MacPaint; *Randall Hilden* of Minneapolis who uses a Mac 512K he's owned since 1985; *Jay Kreibich,* a high-school junior from Elmhurst, Illinois, who began computing with an Apple IIe in the fourth grade; *Brian Lichtenwalter,* a computer science major at a Fort Worth, Texas, university who hopes to become a software developer; *Mark Sebar* of Van Nuys, California, who writes novels and screenplays on his Mac Plus; *Gary Specker* of Los Altos, California, who used his IIcx to design the dream house he plans to build; and *Paul Swearingen,* a high-school journalism teacher from Topeka, Kansas, who helps his students publish their school newspaper on an SE.

PHOTOGRAPHS BY LUIS DELGADO

COLOR GRAPHICS BOARD—8-BIT



Product, Manufacturer	% of votes
Macintosh Display Card 8•24, Apple	**35**
DirectColor series, Radius	14
Macintosh Display Card 4•8, Apple	13
RasterOps 8S, RasterOps	10
Spectrum/8, SuperMac Technology	8
RasterOps 8L, RasterOps	7
Others	13

(51% of respondents voted in this category)

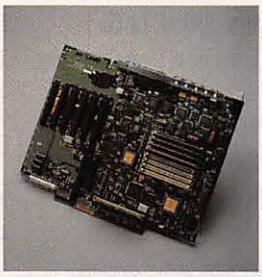
COLOR GRAPHICS BOARD—24-BIT



Product, Manufacturer	% of votes
Macintosh Display Card 8•24 GC, Apple	**19**
Macintosh Display Card 8•24, Apple	17
Radius DirectColor/24, Radius	13
Video ColorBoard 364, RasterOps	11
RasterOps 24L, RasterOps	10
Others	30

(49% of respondents voted in this category)

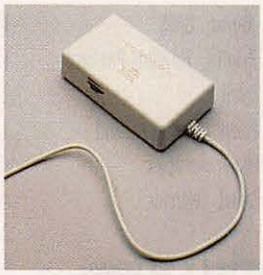
CPU/ACCELERATOR UPGRADE



Product, Manufacturer	% of votes
Macintosh IIfx Logic Board Upgrade, Apple	**18**
Accelerator series, Radius	13
MaraThon series, Dove Computer	9
FastCache IIci, DayStar Digital	9
PowerCard 030 series, DayStar Digital	7
Macintosh SE/30 Logic Board Upgrade, Apple	7
Others	37

(57% of respondents voted in this category)

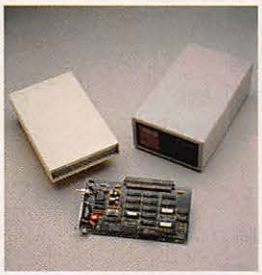
DIGITAL AUDIO



Product, Manufacturer	% of votes
MacRecorder, Farallon Computing	**64**
Voice Link, Articulate Systems	10
MacProteus, Digidesign	8
Sound Accelerator, Digidesign	8
Audiomedia, Digidesign	7
Others	3

(45% of respondents voted in this category)

ETHERNET HARDWARE



Product, Manufacturer	% of votes
EtherGate, Shiva	**17**
EtherPort series, Shiva	**16**
FastPath, Shiva	**15**
GatorBox, Cayman Systems	13
FastNet series, Dove Computer	10
DaynaPort series, Dayna Communications	10
Others	19

(38% of respondents voted in this category)

HARD DRIVE—UNDER 80MB



Product, Manufacturer	% of votes
Apple	**20**
La Cie	13
Jasmine Technologies	9
Ehman	6
CMS Enhancements	5
Others	47

(78% of respondents voted in this category)

HARD DRIVE—80MB TO 160MB



Product, Manufacturer	% of votes
La Cie	**14**
Apple	**13**
Rodime Systems	8
Jasmine Technologies	7
GCC Technologies	5
Microtech International	5
Others	48

(62% of respondents voted in this category)

HARD DRIVE—OVER 160MB



Product, Manufacturer	% of votes
La Cie	**13**
MicroNet Technology	9
Apple	8
Rodime Systems	6
FWB	6
GCC Technologies	6
Others	52

(47% of respondents voted in this category)

INPUT DEVICE



Product, Manufacturer	% of votes
Apple Extended Keyboard II, Apple	**24**
Turbo Mouse, Kensington Microware	20
Apple Keyboard, Apple	7
Mac-101, Datadesk International	7
Apple Mouse, Apple	5
Voice Navigator, Articulate Systems	5
Others	32

(79% of respondents voted in this category)

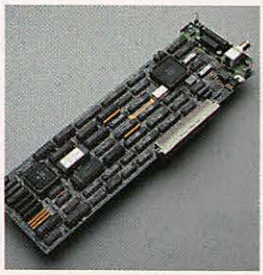
LOCALTALK HARDWARE



Product, Manufacturer	% of votes
PhoneNet series, Farallon Computing	**47**
LocalTalk Connector/Cable Kits, Apple	20
PhoneNet StarController, Farallon	7
TurboNet series, Nuvotech	6
Others	20

(54% of respondents voted in this category)

MICRO-TO-MAINFRAME COMMUNICATIONS



Product, Manufacturer	% of votes
Apple Coax/Twinax Card, Apple	**32**
MacIRMA, Digital Communications Associates	24
MacMainFrame series, Avatar	20
Netway family, Tri-Data Systems	7
Others	17

(33% of respondents voted in this category)

MIDI INTERFACE



Product, Manufacturer	% of votes
Apple MIDI Interface, Apple	**41**
Studio 3, Opcode Systems	13
MIDI Transport, Passport Designs	11
MIDI Time Piece, Mark of the Unicorn	11
Professional Plus, Opcode Systems	7
Others	17

(34% of respondents voted in this category)

MODEM—24-BAUD



Product, Manufacturer	% of votes
Hayes Microcomputer Products	**30**
Zoom Telephonics	13
Practical Peripherals	10
Apple	9
Prometheus Products	6
Others	32

(68% of respondents voted in this category)

MODEM—9600-BAUD



Product, Manufacturer	% of votes
Hayes Microcomputer Products	**43**
U.S. Robotics	14
Shiva	8
Prometheus Products	7
Farallon	5
Others	23

(44% of respondents voted in this category)

MODEM—FAX



Product, Manufacturer	% of votes
DoveFax series, Dove Computer	**34**
Interfax 24/96, Abaton	15
ProModem series, Prometheus Products	10
OrchidFax, Orchid Technology	10
DataLink, Applied Engineering	10
Others	21

(44% of respondents voted in this category)

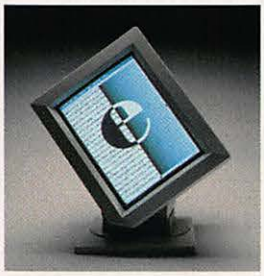
MONITOR—COLOR



Product, Manufacturer	% of votes
AppleColor High-Resolution RGB Monitor, Apple	**38**
Radius Color System, Radius	15
19" Trinitron, SuperMac Technology	10
Trinitron, Sony	6
Macintosh 12" RGB Display, Apple	5
19" Color Display, SuperMac Technology	5
Others	21

(68% of respondents voted in this category)

MONITOR—MONOCHROME



Product, Manufacturer	% of votes
Pivot, Radius	**19**
Hi-Res Monochrome Monitor, Apple	15
Apple Macintosh Portrait Display, Apple	14
Two Page Display, Radius	12
Apple Two-Page Monochrome Monitor, Apple	9
Radius Full Page Display, Radius	8
Others	23

(64% of respondents voted in this category)

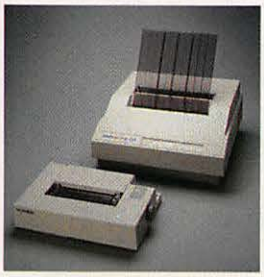
OPTICAL DRIVE



Product, Manufacturer	% of votes
ZFP+ 600 Magneto Optical, La Cie	**16**
MacinStor Erasable Optical series, Storage Dimensions	10
Infinity Optical, PLI	10
hammerDisk600S, FWB	9
LaserFrame, SuperMac Technology	8
SB-SMO-1, MicroNet Technology	6
Others	41

(33% of respondents voted in this category)

PRINTER—COLOR



Product, Manufacturer	% of votes
ColorScript 100 series, QMS	**18**
HP PaintJet XL Printer, Hewlett-Packard	**16**
XL-7700, Eastman Kodak	12
HP PaintWriter XL Printer, Hewlett-Packard	11
Phaser IIDX Color Printer, Tektronix	6
Phaser IISX Color Printer, Tektronix	6
Others	31

(45% of respondents voted in this category)

PRINTER—LASER



Product, Manufacturer	% of votes
LaserWriter IINTX, Apple	**34**
LaserWriter IINT, Apple	17
Personal LaserWriter NT, Apple	6
HP LaserJet III Printer, Hewlett-Packard	6
QMS-PS 410, QMS	5
TI microlaser PS17 & PS35, Texas Instruments	4
HP LaserJet IIP Printer, Hewlett-Packard	4
Others	24

(80% of respondents voted in this category)

PRINTER—OTHER



Product, Manufacturer	% of votes
HP DeskWriter Printer, Hewlett-Packard	**33**
ImageWriter II Printer, Apple	**31**
HP DeskJet Printer series, Hewlett-Packard	11
ImageWriter LQ, Apple	9
Others	16

(71% of respondents voted in this category)

REMOVABLE-MEDIA DRIVE



Product, Manufacturer	% of votes
Bernoulli Box series, Iomega	**19**
Infinity40 Turbo, PLI	10
45MB Removable Cartridge Drive, Ehman	9
Microtech R50, Microtech International	9
ZFP 45R, La Cie	6
MR-45, MicroNet Technology	6
Others	41

(47% of respondents voted in this category)

SCANNER—BLACK-AND-WHITE/GRAY-SCALE



Product, Manufacturer	% of votes
Apple Scanner, Apple	**24**
HP ScanJet Plus, Hewlett-Packard	16
ThunderScan Plus, Thunderware	11
MSF-400GGS, Microtek	9
LightningScan 400, Thunderware	5
Others	35

(57% of respondents voted in this category)

SCANNER—COLOR



Product, Manufacturer	% of votes
MSF-300Z, Microtek	**22**
LS-3500 Film Scanner, Nikon	**19**
Silverscanner, La Cie	16
JX series, Sharp	11
Agfa Focus Color Scanner, Agfa Compugraphic	8
Scanmaster series, Howtek	6
Others	18

(40% of respondents voted in this category)

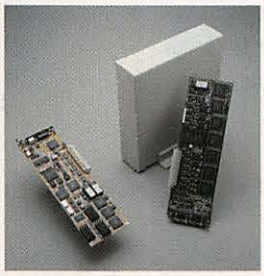
TAPE DRIVE



Product, Manufacturer	% of votes
Apple	**18**
EMAC	9
GCC Technologies	8
MicroNet Technology	8
Microtech International	7
CMS Enhancements	6
Others	44

(41% of respondents voted in this category)

VIDEO CAPTURE/EFFECTS



Product, Manufacturer	% of votes
ColorBoard 364, RasterOps	**17**
RadiusTV, Radius	**16**
MacVision Color Video Digitizer, Koala Technologies	11
NuVista+, TrueVision	11
FrameGrabber 324NC, RasterOps	10
ComputerEyes/Pro Color Video Digitizer, Digital Vision	6
Others	29

(38% of respondents voted in this category)

MOST PROMISING NEWCOMER—HARDWARE



Product, Manufacturer	% of votes
Macintosh IIsi, Apple	**12**
Macintosh LC, Apple	**12**
Macintosh Classic, Apple	7
Macintosh IIfx, Apple	4
Typist, Caere	4
Pivot, Radius	3
Others	58

(39% of respondents voted in this category)

BEST CUSTOMER SUPPORT—HARDWARE



Product, Manufacturer	% of votes
Apple	**18**
Hewlett-Packard	5
La Cie	4
Microtech International	4
Ehman	3
SuperMac Technology	3
Others	63

(42% of respondents voted in this category)

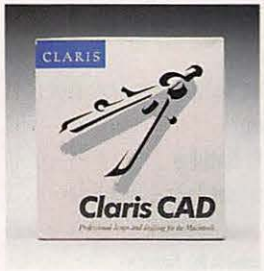
Five-Time Winners

Hardware

Several hardware products and product lines stood out as five-time award winners. Apple's ImageWriter II won (along with Hewlett-Packard's DeskWriter) the Printer—Other category, and Apple's LaserWriter II series—specifically, the new LaserWriter IINTX—once again took the Printer—Laser division. Predictably, Hayes, with its communications-standard–setting product line, had no trouble sweeping the modem categories. Radius once again sewed up the monochrome monitor award—but this time with its flashy new Pivot Display.

World Class AWARDS

2-D DESIGN



Product, Manufacturer	% of votes
Claris CAD, Claris	28
MacDraft, Innovative Data Design	21
Dreams, Innovative Data Design	12
AutoCAD, Autodesk	7
Others	32

(22% of respondents voted in this category)

3-D DESIGN



Product, Manufacturer	% of votes
Swivel 3D/Swivel 3D Professional, Paracomp	29
Super 3D, Silicon Beach Software	21
MiniCAD+, Graphsoft	7
AutoCAD, Autodesk	6
StrataVision 3d, Strata	5
Others	32

(13% of respondents voted in this category)

AUTHORING TOOL



Product, Manufacturer	% of votes
HyperCard, Claris	70
SuperCard, Silicon Beach Software	17
Authorware Professional, Authorware	4
Plus, Spinnaker Software	2
Others	7

(61% of respondents voted in this category)

BLACK-AND-WHITE PAINT



Product, Manufacturer	% of votes
SuperPaint, Silicon Beach Software	49
Canvas, Deneba Software	21
MacPaint, Claris	18
Studio/1, Electronic Arts	5
Others	7

(81% of respondents voted in this category)

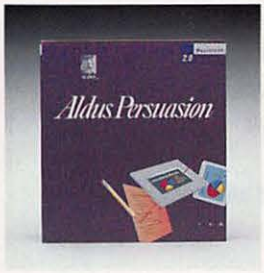
BUSINESS ACCOUNTING



Product, Manufacturer	% of votes
M.Y.O.B., Teleware	14
atOnce, Peachtree Software	12
Great Plains Accounting, Great Plains	12
Insight Expert Accounting Series, Peachtree Software	7
Accountant, Inc., Softsync/Bloc	6
Back to Basics: Professional, Peachtree Software	6
Others	43

(44% of respondents voted in this category)

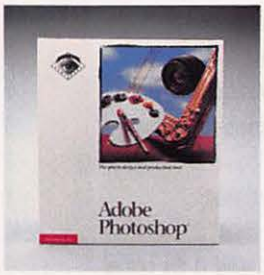
BUSINESS PRESENTATION GRAPHICS



Product, Manufacturer	% of votes
Aldus Persuasion, Aldus	36
Microsoft PowerPoint, Microsoft	16
MacDraw II, Claris	13
More, Symantec	9
DeltaGraph, DeltaPoint	7
Wingz, Informix Software	5
Others	14

(70% of respondents voted in this category)

COLOR PAINT



Product, Manufacturer	% of votes
Adobe Photoshop, Adobe Systems	39
PixelPaint/PixelPaint Professional, SuperMac Technology	28
UltraPaint, Deneba Software	9
Studio/8, Electronic Arts	8
ColorStudio, Letraset USA	8
Others	8

(55% of respondents voted in this category)

DATABASE—DEVELOPER TOOL



Product, Manufacturer	% of votes
4th Dimension, ACIUS	35
FoxBase+/Mac, Fox Software	19
Double Helix, Odesta	14
dBase Mac, Ashton-Tate/New Era Software	13
Oracle for the Macintosh, Oracle	7
Reflex Plus, Borland International	6
Others	6

(56% of respondents voted in this category)

DATABASE—END USER



Product, Manufacturer	% of votes
FileMaker Pro, Claris	53
Microsoft Works, Microsoft	26
Panorama, ProVue Development	7
Microsoft File, Microsoft	5
File Force, ACIUS	3
RecordHolder Plus, Software Discoveries	2
Others	4

(69% of respondents voted in this category)

DRAWING/ILLUSTRATION



Product, Manufacturer	% of votes
Adobe Illustrator, Adobe Systems	28
Aldus FreeHand, Aldus	22
MacDraw II/MacDraw, Claris	17
SuperPaint, Silicon Beach Software	16
Canvas, Deneba Software	10
MacDraft, Innovative Data Design	3
Others	4

(85% of respondents voted in this category)

EDUCATION



Product, Manufacturer	% of votes
Carmen Sandiego series, Brøderbund	31
Practica Musica, Ars Nova Software	7
Reader Rabbit, The Learning Company	6
Typing Tutor IV, Simon & Schuster Computer Software	5
Math Blaster Mystery, Davidson & Associates	5
Type, Brøderbund	5
Others	41

(53% of respondents voted in this category)

ELECTRONIC MAIL



Product, Manufacturer	% of votes
Microsoft Mail, Microsoft	45
QuickMail, CE Software	40
InBox, Sitka	7
cc:Mail, cc:Mail	4
3+Mail for Macintosh, 3Com	2
Others	2

(49% of respondents voted in this category)

FILE SERVER



Product, Manufacturer	% of votes
AppleShare File Server, Apple	45
MacTOPS, Sitka	35
Netware, Novell	12
Others	8

(54% of respondents voted in this category)

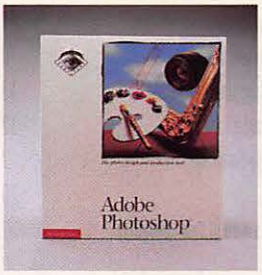
GAME



Product, Manufacturer	% of votes
SimCity, Maxis	12
Tetris, Spectrum HoloByte	10
Crystal Quest, Casady & Greene	7
Falcon, Spectrum HoloByte	5
Where in the World Is Carmen Sandiego?, Brøderbund	3
MacGolf/MacGolf Classic, XOR	3
Others	60

(72% of respondents voted in this category)

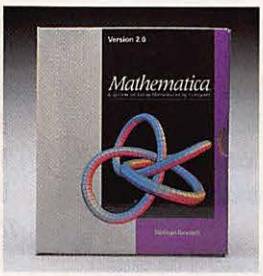
IMAGE PROCESSING



Product, Manufacturer	% of votes
Adobe Photoshop, Adobe Systems	57
Digital Darkroom, Silicon Beach Software	24
ImageStudio, Letraset USA	8
ColorStudio, Letraset USA	7
Enhance, MicroFrontier	2
Others	2

(51% of respondents voted in this category)

MATHEMATICS



Product, Manufacturer	% of votes
Mathematica, Wolfram Research	54
MathCAD, MathSoft	15
Theorist, Prescience	8
Eureka: The Solver, Borland International	6
PowerMath II, Central Products	4
MATLAB, The MathWorks	4
Others	9

(43% of respondents voted in this category)

MICRO-TO-MAINFRAME COMMUNICATIONS



Product, Manufacturer	% of votes
White Knight, The Freesoft Company	15
VersaTerm-Pro, Synergy Software	14
MicroPhone II, Software Ventures	13
MacTerminal, Apple	9
Pathworks for Macintosh, Digital Equipment	7
MacWorkstation, Apple	7
Others	35

(42% of respondents voted in this category)

MULTIMEDIA/ANIMATION



Product, Manufacturer	% of votes
MacroMind Director, MacroMind	48
HyperCard VideoDisc Toolkit, APDA-Apple	12
FilmMaker, Paracomp	9
VideoWorks Interactive, MacroMind	6
Others	25

(44% of respondents voted in this category)

MUSIC NOTATION



Product, Manufacturer	% of votes
Finale, Coda Music Software	27
Encore, Passport Designs	17
DeluxeMusic Construction Set, Electronic Arts	15
Professional Composer, Mark of the Unicorn	15
MusicProse, Coda Music Software	7
Music Publisher, Repertoire	7
Others	12

(34% of respondents voted in this category)

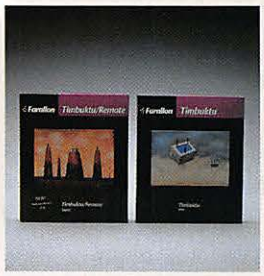
MUSIC SEQUENCING



Product, Manufacturer	% of votes
Performer, Mark of the Unicorn	17
DeluxeRecorder, Electronic Arts	11
Studio Session, Bogas Productions	11
Pro 4, Passport Designs	9
Vision, Opcode Systems	8
Studio Vision, Opcode Systems	8
Others	36

(32% of respondents voted in this category)

NETWORK MANAGEMENT/UTILITY



Product, Manufacturer	% of votes
Timbuktu/Timbuktu Remote, Farallon	**36**
Public Folder, Claris	13
LapLink Mac III, Traveling Software	9
Carbon Copy Mac, Microcom	8
AppleTalk Internet Router, Apple	6
Inter Poll Network Administrator's Utility, Apple	6
Others	22

(42% of respondents voted in this category)

OCR



Product, Manufacturer	% of votes
OmniPage, Caere	**61**
Read-It, Olduvai	15
AccuText, Xerox Imaging Systems	7
ScanReader, CTA	5
TopScan, Calera	4
TextScan, Prism Enterprises	3
Others	5

(44% of respondents voted in this category)

PAGE LAYOUT



Product, Manufacturer	% of votes
Aldus PageMaker, Aldus	**64**
QuarkXPress, Quark	20
ReadySetGo, Letraset USA	4
Publish-It, TimeWorks	3
FrameMaker for the Mac, Frame Technology	2
DesignStudio, Letraset USA	2
Others	5

(78% of respondents voted in this category)

PERSONAL FINANCE



Product, Manufacturer	% of votes
Quicken, Intuit	**48**
Andrew Tobias' Managing Your Money, Meca Software	16
Dollars & Sense, Software Toolworks	13
MacMoney, Survivor Software	12
Others	11

(65% of respondents voted in this category)

PROGRAMMING LANGUAGE



Product, Manufacturer	% of votes
Think C, Symantec	**38**
Think Pascal, Symantec	16
MPW C, Apple	12
QuickBASIC, Microsoft	11
MPW Pascal, Apple	6
Others	17

(50% of respondents voted in this category)

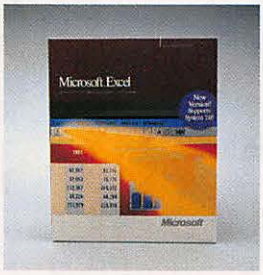
PROJECT MANAGEMENT



Product, Manufacturer	% of votes
MacProject II, Claris	**64**
MacSchedule/MacSchedule Plus, Mainstay	10
FastTrack Schedule, AEC Software	8
Micro Planner/Micro Planner X-pert, Micro Planning	6
KeyPlan, Symmetry Software	3
AEC Information Manager, AEC Software	3
Others	6

(45% of respondents voted in this category)

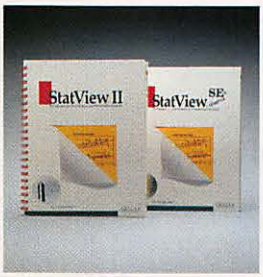
SPREADSHEET



Product, Manufacturer	% of votes
Microsoft Excel, Microsoft	**69**
Wingz, Informix Software	15
Microsoft Works, Microsoft	10
Full Impact, Ashton-Tate	4
Others	2

(86% of respondents voted in this category)

STATISTICS



Product, Manufacturer	% of votes
StatView II/SE + Graphics, Abacus Concepts	**40**
Data Desk, Odesta	13
SYSTAT, SYSTAT	12
SPSS for the Macintosh, SPSS	10
SuperANOVA, Abacus Concepts	6
Others	19

(38% of respondents voted in this category)

TAX PREPARATION/PLANNING



Product, Manufacturer	% of votes
MacInTax, SoftView	**86**
TurboTax, ChipSoft	6
Others	8

(55% of respondents voted in this category)

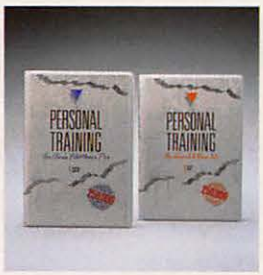
TELECOMMUNICATIONS



Product, Manufacturer	% of votes
MicroPhone II, Software Ventures	**24**
White Knight, The FreeSoft Company	18
Smartcom, Hayes Microcomputer Products	13
Microsoft Works, Microsoft	12
VersaTerm-Pro, Synergy Software	7
Others	26

(68% of respondents voted in this category)

TRAINING



Product, Manufacturer	% of votes
Personal Training Systems	**48**
Heizer Software	12
Mindscape	11
FlipTrack Learning Systems	5
Individual Software	5
Help Software	4
Others	15

(35% of respondents voted in this category)

UTILITY—APPLICATION ENHANCEMENT



Product, Manufacturer	% of votes
Word Finder, Microlytics	**10**
TypeStyler, Broderbund	7
DeskPaint & Draw, Zedcor	7
Grammatik Mac, Reference Software International	5
Correct Grammar for the Mac, Writing Tools Group	5
QuickDex, Casady & Greene	5
Others	61

(72% of respondents voted in this category)

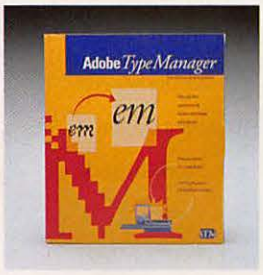
UTILITY—PROTECTION/RECOVERY/BACKUP



Product, Manufacturer	% of votes
The Norton Utilities for the Mac, Symantec	**23**
SUM II, Symantec	19
SAM, Symantec	18
MacTools/PC Tools for the Mac, Central Point Software	12
DiskFit, SuperMac Technology	5
Fastback for the Mac, Fifth Generation Systems	3
Others	20

(84% of respondents voted in this category)

UTILITY—SYSTEM ENHANCEMENT



Product, Manufacturer	% of votes
Adobe Type Manager (ATM), Adobe Systems	**26**
After Dark, Berkeley Systems	11
Suitcase II, Fifth Generation Systems	10
DiskTop, CE Software	5
QuicKeys², CE Software	4
Boomerang, Zeta Soft	4
Others	40

(84% of respondents voted in this category)

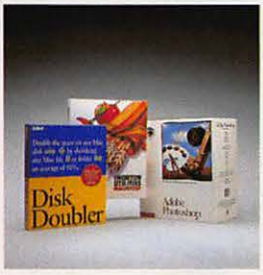
WORD PROCESSOR



Product, Manufacturer	% of votes
Microsoft Word, Microsoft	**62**
MacWrite II, Claris	11
Microsoft Works, Microsoft	7
WriteNow, T/Maker	6
WordPerfect for the Macintosh, WordPerfect	5
Full Write Professional, Ashton-Tate	4
Others	5

(95% of respondents voted in this category)

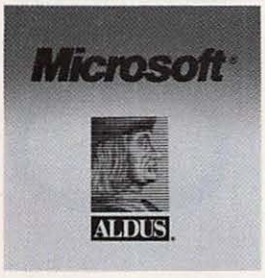
MOST PROMISING NEWCOMER—SOFTWARE



Product, Manufacturer	% of votes
The Norton Utilities for the Mac, Symantec	**4**
Adobe Photoshop, Adobe Systems	**3**
DiskDoubler, Salient Software	**3**
Data Club, International Business Software	2
SimEarth, Maxis	1
TurboTax, ChipSoft	1
Others	86

(44% of respondents voted in this category)

BEST CUSTOMER SUPPORT—SOFTWARE



Product, Manufacturer	% of votes
Microsoft	**14**
Aldus	**13**
Claris	8
MacConnection	5
Symantec	4
Adobe Systems	3
Others	53

(53% of respondents voted in this category)

Five-Time Winners

Software

A number of products stand out as World-Class winners for the fifth year in a row. Among these are Microsoft Word and Excel, whose continued domination of their respective markets is a testament to Microsoft's marketing clout. FileMaker Pro, another five-time winner—and Claris's biggest money maker—predictably took the Database—End User category, while another Claris product, MacProject, found no real competition in the Project Management category and easily captured its fifth title. Another five-time software winner was Aldus PageMaker for Page Layout—still far and away the leading desktop publishing program, though QuarkXPress has managed to narrow the gap. Freesoft's White Knight (formerly Red Ryder) also won its fifth award—this time for Micro-to-Mainframe Communications. M

FAX MODEM FACTS

This year fax modems hold their own

"I'LL FAX THAT TO YOU. WHAT'S YOUR NUMBER?"

Rare just a few years ago, fax machines are now taken for granted. In fact, you may actually appear to be unprofessional if you don't have a fax number. I've been using a neighborhood fax service, but lately I've been looking for a more convenient alternative. A fax modem may be the best solution.

Why a fax modem instead of a dedicated fax machine? Convenience and cost tell the tale. Most of the documents I need to fax I create on my Mac, and I like the idea of sending a document directly from my screen to the recipient. Also, it takes less time and I waste less paper. And, because all the units I looked at double as data modems, a fax modem saves scarce desktop real estate. Best of all, even though prices on standard fax machines are dropping, a fax modem can still be more economical. If your faxing needs mostly involve files generated on the Mac, a fax modem is your best choice.

This is *Macworld*'s third annual report on fax modems, and the offerings have matured markedly since last year. Even the best of last year's crop had annoying flaws, but the class of '91 has several members worth recommending. Macworld Lab tested ten fax modems, all of which transmit faxes at a top speed of 9600 bits per second (bps) and as Hayes-compatible modems, transmit data at 2400 bps. All but two of the tested modems are external modems, which sit on the desk. The two internal modems are PSI Integration's Comport for the Macintosh Portable, and Applied Engineering's DataLink LC for the Macintosh LC.

Last year's anemic AppleFax Modem was overpriced, plagued by technical problems, and saddled with software severely lacking in features. Now discontinued, the AppleFax joins the ranks of other ill-fated Apple peripherals, such as the ImageWriter

by Tom Negrino

PHOTOGRAPHS BY ERIC HARGER



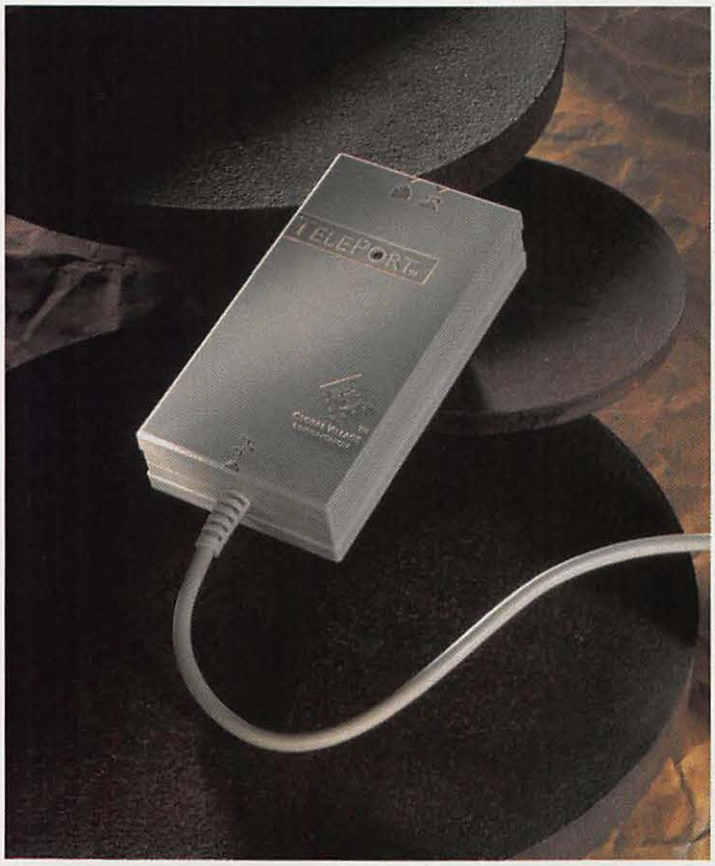
From top to bottom: PSI Integration's Comport internal fax modem for the Macintosh Portable; Zoom Telephonics' Zoom MX9600S, an inexpensive send-only unit; and Dove Computer's DoveFax Desktop, an excellent send-and-receive fax modem.

FAX MODEMS HAVE COME OF AGE

LQ, in well-deserved oblivion. Owners of the orphaned AppleFax can upgrade to Solutions' BackFax software for $29 plus shipping costs—contact Solutions for details.

Easy as Printing

All fax modems come with at least three parts: the hardware; a fax driver that goes in the System Folder and is accessed via the Chooser; and an application that usually keeps a fax log and lets you set preferences and view and print received faxes. A good way to think of the faxing process is to imagine you're using a printer that's far away. The twist, of course, is that when printing to a fax machine, you can choose from millions of remote printers. You select the fax driver in the Chooser, then choose Print from any application. Usually you then specify the recipient from the Print dialog box. Fax software converts the document to fax format and gives you the option of sending the fax right away or holding it on disk for later transmission.



Global Village's TelePort/Fax 9600 is unique in that it connects to and draws power from the Mac's Apple Desktop Bus port.

Fax machines can send and receive faxes at fine resolution, which corresponds to 203 by 196 dots per inch, or at standard resolution, which is 203 by 98 dpi. Naturally it takes less time to transmit documents in standard resolution, saving you toll charges, but the trade-off is sharpness and some readability.

Generally speaking, the fax software handles incoming faxes in the background, so you can do other work while the computer receives and stores the fax on the hard drive. Of course, to receive a fax, the Mac and fax modem have to be turned on, and the fax software needs to be waiting for a call.

Group Facts

The current standard in fax machines is Group 3 compatibility, in which fax machines use a specific compression scheme to send and receive fax data at 9600 bps. Although Group 2 fax modems work at a top speed of 4800 bps, you don't need to worry about compatibility between the two groups because when fax machines make a connection, they automatically negotiate the highest speed at which they can both transmit. If a Group 2 machine calls up a Group 3 fax machine or modem, the Group 3 unit *trains down* from 9600 to 4800 bps to receive the fax.

In our test suite, we focused on Group 3 fax modems that use chip sets from two manufacturers. Most use a chip set from Rockwell, capable of both sending and receiving faxes. Three of the tested units use the Sierra chip set, which can only send faxes.

Plug and Send

Most fax modems look like your average data modem—squat boxes with a row of status lights on the front. Status lights are convenient when you have a problem, offering clues on how to fix the difficulty. All the tested modems plug into the modem port, with the exception of Global Village Communication's TelePort/Fax 9600, which connects to the Apple Desktop Bus (ADB) port, leaving the modem port free for other peripherals such as a graphics tablet or a label printer. And since the TelePort is powered from ADB (you could plug it into an ADB keyboard, for instance), it doesn't take up space on a plug strip with a boxy power adapter, as do all the other modems. The TelePort makes up for its lack of status lights by putting a useful status display in the menu bar whenever the modem is in use. Circuit Research's FlexFax 9624M is also missing status lights; its lights tell you only if the modem is in fax or data mode.

Anyone who's spent time using modems knows that they sometimes lock up and that the best way to reset them is to simply turn them off and then back on. That's why I get peeved at

modem manufacturers who don't put a power switch on their units. The recipients of this year's Grumble Award are Dove's DoveFax Desktop, the FlexFax, and the TelePort. Because internal boards lack power switches, you must restart the Mac to reset an internal modem. You wouldn't want to be able to turn off a board inside a Macintosh that's running.

The DataLink LC's expandability deserves special mention. The base unit is a send-only internal board for the Mac LC, but in addition to an extra serial port, you can add chips that enable it to receive faxes; use the V.42bis data correction/compression protocol, which increases data throughput to as much as 9600 bps; or best of all, add a 68882 math coprocessor to the LC.

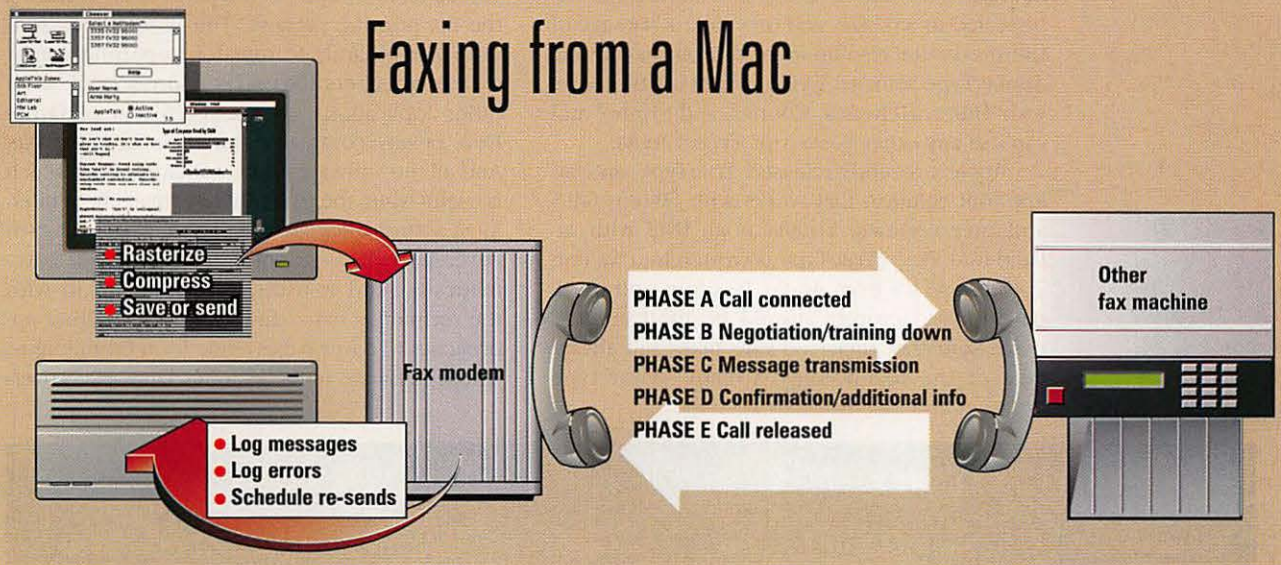
Right now, the only unit that features automatic wake-up is the Comport for the Macintosh Portable. It "wakes" the Portable from Sleep mode to send a previously scheduled fax or to receive a fax.

Resolving Font Issues

Getting good-looking faxes, especially ones with text, can be a real challenge. That's because the Mac's screen resolution is 72 dpi while Group 3 fax resolution is 200 dpi.

There are two main approaches to getting high-quality text output. The first is to use triple-size bitmapped screen fonts, originally developed for the ImageWriter LQ. With this approach, the fax driver looks in the System file for fonts that are three times the size of each font used in the document. For a memo written in 12-point Helvetica, for instance, you need to have Helvetica 36 installed. The driver then compresses these large-size fonts to the size in the original file and sends the resulting higher-resolution document.

Faxing from a Mac



Using a fax modem to transmit a file from a Macintosh to another fax modem or fax machine is quite simple, but the data undergoes several transformations in the process.

Inside the Macintosh

You select a fax modem from within the Chooser, much as you would a printer. The fax modem driver rasterizes the document (converts it from QuickDraw to a bitmapped fax format); compresses it to reduce transmission time; and saves the file or sends it to the fax modem.

Inside the fax modem

Firmware contained on the modem's chip set prepares the data for transmission over phone lines by converting the data from digital to analog form. Fax modems follow the same protocols, or procedures, as those defined for standard fax machines. **(Phase A)** The call is established between the sending and receiving fax modem or machine. **(Phase B)** The two parties communicate at 300 bps to identify capabilities such as the group type (Group 3, for instance) and the highest speed at which the receiving fax machine can correctly receive the data; *training down*, or dropping to a lower speed, takes place if noise in the line is too high. **(Phase C)** The first page is transmitted and error detection and correction take place. **(Phase D)** The receiving fax modem or machine confirms that the page has been received correctly, or renegotiates the transmission speed (as in Phase B), and the page is sent again. The sending fax modem may signal that there are additional pages. **(Phase E)** After signaling that the transmission is complete, the fax modem releases the call.

Back in the Macintosh

Most fax modem software packages then record when and where a fax was sent and log problems, if any; some reschedule transmission if the line is busy.

FAXING SHOULD BE AS EASY AS PRINTING

There are several drawbacks to this approach. You can only get high-quality text from fonts for which you have triple sizes installed. If they are not installed, the Mac attempts to create higher-quality 200-dpi output from 72-dpi bitmapped fonts by first building the triple-size font, then scaling it down to the smaller font size for printing, with predictably poor results. All those font sizes take up valuable disk space. Few easily available fonts come in the triple sizes. Abaton ships clones of Times and Helvetica called SWA Dutch and SWA Swiss in the appropriate sizes, but you must reformat your documents to accommodate these new fonts.

A better solution, and one I strongly recommend, is to use one of the outline font technologies from Adobe or Apple. Outline fonts can be scaled to any size, and they take advantage of the maximum resolution of the output device. Adobe Type Manager (ATM), a $99 utility, comes with Times, Helvetica, Courier, and Symbol and can use any other PostScript Type 1 fonts.

Apple's recently released TrueType, an outline font solution that works with System 6.0.5 and later versions, installs as an INIT with related font files. (TrueType is written into System 7.) Because it's from Apple, it is free, and third-party manufacturers should be motivated to make sure that their software takes full advantage of the technology. Already major type houses, such as Monotype, Bitstream, Linotype, and Letraset, have announced or are shipping TrueType versions of their type libraries. Solutions has licensed TrueType and will include it with BackFax software.

A pleasant side effect of ATM and TrueType is that not only do they banish the jaggies from faxed and printed output, they also improve the look of large and odd-size type on screen.

Software Makes the Difference

Ideally, printing to a fax modem should be as easy and transparent as printing to, say, a LaserWriter. In evaluating the software that comes with the fax modems, intuitive operation and ease of use were especially important. For instance, well-designed software sends and receives faxes in the background, without requiring extra steps from you.

All the software we tested lets you keep an address book of fax numbers, and all, except Zoom Telephonics' QuickLink II fax software, lets you add a new name to the address book during the fax printing process. The Prometheus software has a handy feature for importing names and fax numbers into a fax address book from other applications, such as FileMaker or DynoDex, or any comma- or tab-delimited text file. And all the software had automatic redial, which is useful when the recipient's fax machine is busy. Most software packages let you create your own cover page in a graphics program, then automatically send it with all faxes, filled in with the recipient's name and fax number. Other approaches to cover pages come from Prometheus, whose software includes a MacDraw-like cover-

FAX-MODEM FEATURES

Company	Name	Price	Send/Receive	Type	Interface	Fax Chip Set
Abaton	InterFax 24/96	$595	●/●	external	DB 25	Rockwell
Applied Engineering	DataLink LC	$349	●/○	internal [1]	Mac LC board	Sierra
Circuit Research	FlexFax 9624M [2]	$895	●/●	external	DIN 8	Rockwell
Computer Friends	LightFax 9624 [3]	$399	●/●	external	DB 25	Rockwell
Cypress Research Corporation	Cypress FaxPro	$1099	●/●	external	DIN 8	Rockwell
Dove Computer	DoveFax Desktop	$449	●/●	external	DIN 8	Rockwell
Dove Computer	DoveFax+ [4]	$549	●/●	external	DIN 8	Rockwell
Global Village Communication	TelePort/Fax 9600	$295	●/○	external	ADB	Sierra
Prometheus Products	ProModem MiniFax [4,5]	$299	●/○	external	DB 25	Sierra
Prometheus Products	ProModem 9600M Plus [6]	$895	●/●	external	DB 25	Analog Devices
Prometheus Products	ProModem 24/96 MSR	$449	●/●	external	DB 25	Rockwell
Prometheus Products	TravelModem [4]	$299	●/○	internal [7]	DB 25	Sierra
Prometheus Products	ProModem Ultima [8]	$995	●/●	external	DB 25	Analog Devices
PSI Integration	Comport	$645	●/●	internal [7]	Mac Portable board	Rockwell
Zoom Telephonics	Zoom MX9600S	$169	●/○	external	DB 25	Sierra

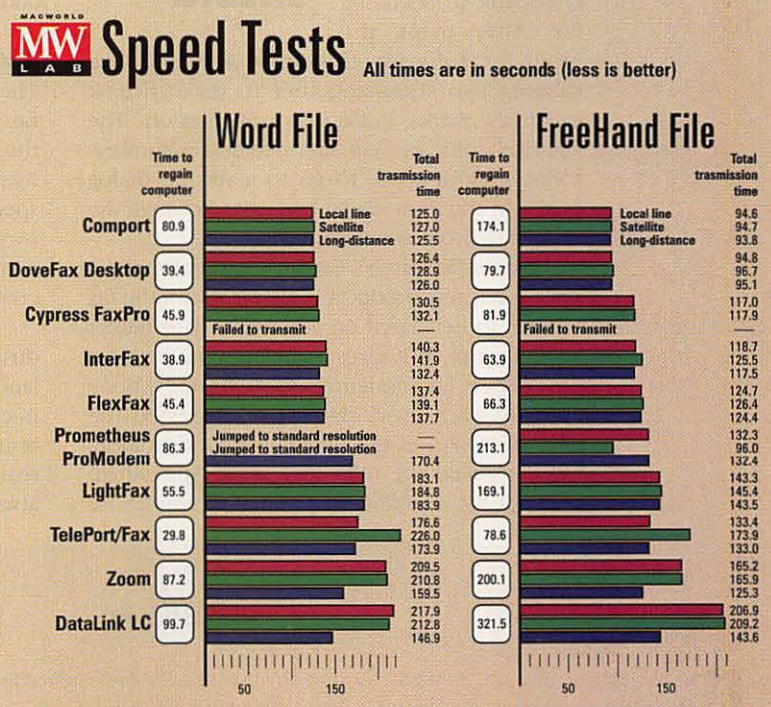
● = yes; ○ = no. All units are both 9600-bps fax and 2400-bps data modems. [1] LC only. [2] Offers proprietary 9600/4800-bps data mode; pass-through serial port. [3] Switches between voice and fax automatically. [4] Not tested. [5] Send/receive unit ($349) shipping soon. [6] Offers 9600-bps V.32bis data; V.42bis/MNP 5. Unit not tested. [7] Portable only. [8] Offers 9600-bps V.32bis data; V.42bis/MNP 5.

page editor, and from Global Village, who will scan artwork sent to the company and return a custom cover-page file. (Global Village will also scan your signature, so that you can use it in fax documents.)

All the software tested keeps a running log of fax activity, including the sender and destination of faxes, the time sent or received, and usually the duration of the call. Abaton's InterFax 24/96 and Computer Friends' LightFax 9624 offer polling, which involves asking if the receiving fax machine has any faxes for the sender and, if it does, retrieving them in the same call. The Abaton fax software includes scanner drivers that let you use an Abaton or Apple-compatible flatbed scanner to scan in documents not created on the Mac. The fax software then converts the scanned image to fax format and sends it. Other file-to-fax format conversion is included by the Prometheus modems (TIFF and MacPaint formats), BackFax (MacPaint, PICT, Glue, TIFF, EPS), the InterFax 24/96 (TIFF, MacPaint, PICT), and the LightFax (TIFF, MacPaint).

PSI's Comport and the DoveFax Desktop include fax software from Palomar Software and STF Technologies that is a joy to use. All the modem setup functions are integrated into the fax driver, and the addressing features are intuitive and simple. These two modems came out at the top of the heap in our speed tests. I really appreciate being able to switch automatically from fax mode to data mode and back again. The fax modems that use BackFax provide no graceful way to switch from fax mode to data mode. You have to open the BackFax application, uncheck the Send and Receive boxes, quit BackFax, and then open a telecommunications program. When you finish a data session, you must return to BackFax to change the modem to fax mode before sending a fax. That's just too much effort for a modem junkie.

The TelePort's software is a standout, particularly for those who regularly alternate printing and faxing. To switch from a printer to a fax modem, you generally must go to the Chooser and click on the fax driver; to print again you must go back to the Chooser and click on the Printer. With the TelePort software, you hold down the option key when you pull down the File menu, and Print turns into Fax for that one print job only. It's a nice time-saver. TelePort also lets you specify MNP data compression/correction (Levels 4 and 5) from the Control Panel. The TelePort software gets demerits, however, for not letting you send one fax to several individuals, even though the modem's manual states that you can. The software lacks delayed sending too (Global Village expects to have a free upgrade adding both features by the time you read this).



Macworld Lab transmitted two files—a FreeHand line drawing and a two-page Microsoft Word file containing several fonts in various sizes and styles—across three simulated line conditions: local, long-distance (overland), and satellite (using the PTT 5101 Telephone Network Simulator and PTT 5151 Echo/Advance Impairment Simulator according to EIA 310 specifications).

Each fax modem was subjected to increasing levels of line noise. The local transmissions were increased in increments of 1 decibel (dB) from –46dB to –36dB. The long-distance transmissions were increased in 1dB increments from –44dB to –34dB. In real-life transmissions, you can connect with local or long-distance lines with noise levels below -40dB 80 percent of the time. For the satellite tests, the noise levels ranged from –63dB to –53dB. Normal noise levels for satellite transmission fall well below those levels. (The larger the negative number, the less line noise.)

When a fax modem encounters a certain level of noise on a line, it drops down in speed—from 9600 bps to 4800 bps, for instance—which results in longer transmission times. The LightFax from Computer Friends held its transmission at 9600 bps at higher noise levels than any of the others in the test suite. The FlexFax from Circuit Research, on the other hand, dropped down after encountering a small increase in line noise. Although all documents were sent in fine mode (203 by 196 dpi), the Prometheus ProModem 24/96MSR switched to standard mode (203 by 98 dpi) in the face of increased line noise. Most fax modems could not send the file when confronted with the highest noise levels, but the Comport, LightFax, InterFax, and DoveFax proved quite robust. The graphs display transmission times for the lowest noise level for each line condition.

Warren L. Henderson, Jr., is founder and president of Henderson Communications Corporation (Moreno City, California). We appreciate his expertise and assistance in helping Macworld Lab design our modem tests.

FAX MODEM SOFTWARE STORES ADDRESSES AND COVER SHEETS

From the sublime to the tedious—we turn to Quick Link II software, bundled with the Zoom MX9600S unit. This was the only unit we tested that did not support background faxing; you need to convert the fax file, save it to disk, then quit your application, start up the QuickLink II program, and use QuickLink to send the fax. After using the other fax software, this approach feels like rubbing two sticks together to make fire: it eventually works, but it's too much effort. The LightFax software was also needlessly cumbersome, requiring you to go to a second dialog box from the Print dialog box just to change the fax quality from standard to fine.

Cypress Research's FaxPro software is unique among our test products in that it allows the fax modem to be shared on a network. This makes a lot of sense, as it saves companies the expense of separate fax modems and dedicated phone lines for each user. Macworld Lab tested the Cypress FaxPro in the single-user configuration, but I installed the unit on a small AppleShare network for an informal evaluation and chose one of the networked SE/30 workstations as the fax server. (You can't hook the fax modem up to the file server, and because the modem is not an AppleTalk device, it needs to be attached to a Mac that's connected to a LocalTalk or EtherTalk network.) The installation went smoothly, and the software worked as advertised, but the fax server's user complained that the machine ran noticeably slower, and asked that I remove the software. As of this writing, Cypress Research said that a new release of the Cypress FaxPro software, which should be available by the time you read this, would improve performance and add several new features.

Testing Fax Speed

The speed at which a modem transmits depends on the design of the modem, the efficiency of the modem's software, and the condition of the telephone lines carrying the signal. To check the speed of the fax modems, Macworld Lab used a two-page, multiple-font Microsoft Word document and a complex one-page line-art document created in Aldus FreeHand as test files.

We sent the files over three simulated industry-standard test lines: a local connection; a land-based coast-to-coast connection; and a connection with a single echo-inducing satellite bounce in each direction. Because testing over real telephone lines introduces too many variables, we used a telephone-network simulator

FUTURE FAX

As this article was put to bed, Dove began shipping the DoveFax+. This $549 version of Dove's standard DoveFax Desktop comes with a microphone and software that allows voice-messaging functions. Besides being able to digitize outgoing messages to a hard drive, the DoveFax+ can record personalized messages for specific callers, forward incoming voice messages, pick up messages remotely, and automatically change outgoing messages depending on the time of day. The modem switches automatically between fax, data, and voice modes.

In addition, Cypress, Global Village, and Dove are adding integration with other applications. Several companies are contemplating new versions of software that will let you import any tab- or comma-delimited list into a fax phone book. By the end of the year, expect support for System 7 features such as interapplication communication, AppleEvents, and the Communications Toolbox (see "Confessions of a System 7 User," *Macworld,* July 1991). Cypress is also adding hooks to its network fax software so that other developers can include direct fax support in their programs.

Prometheus, Global Village, and Abaton have already added MNP Class 5 error correction and data compression to their modems; Applied Engineering and PSI are implementing the new V.42bis data-compression standard.

Solutions, maker of the BackFax software bundled with some fax modems, has announced a version that will let many users on a LocalTalk network share one fax modem, with or without an AppleShare server. Each user can have his or her own address book, and the program can save incoming faxes in TIFF format for reading by optical character recognition (OCR) software.

Global Village plans to offer a service similar to that already offered by AT&T and MCI allowing you to send faxes to, say, 500 people every night. The problem is that these services have terrible user interfaces. You will be able to call up Global Village's fax server and upload a destination list and a document. The fax server will then pass on the list and document to the phone companies, and faxes will go to your 500 close friends without tying up your phone all night long.

from PTT (Processing Telecom Technologies) to create the different line conditions. The PTT equipment ensured that test conditions were consistent for each fax modem. The faxes were received on a Sharp UX 195 fax machine.

We tried to send each test file from each modem 11 times on each type of line, gradually increasing the noise level on the line and noting how each fax modem handled the impairment. All the tested fax modems train down from 9600 bps to slower speeds as the noise in the line increases. Those that train down in response to lower levels of noise inevitably take longer to send faxes. Besides training down, the Prometheus ProModem 24/96MSR switched from fine to standard mode; other modems simply dropped the line and redialed later, waiting for a better telephone line connection. We also ran an informal test from the fax machine in the *Macworld* editorial offices to the Sharp machine over regular phone lines. The test times for the two fax machines were very close to the times recorded by the fastest fax modems.

The speediest units overall were the Comport and the DoveFax Desktop, followed closely by the Cypress FaxPro, the InterFax, and the FlexFax. Limping along at the rear of the pack were the Zoom Fax and the DataLink LC, which were consistent slowpokes.

Some modems have problems with noisy telephone lines. The Cypress FaxPro was unable to complete any of the test runs on the simulated coast-to-coast connection. And we found an obscure bug in the Prometheus ProModem 24/96MSR that forced the software to switch from fine to standard mode when the line noise increased and the modem dropped to a slower speed—without notification. Prometheus is working on a fix.

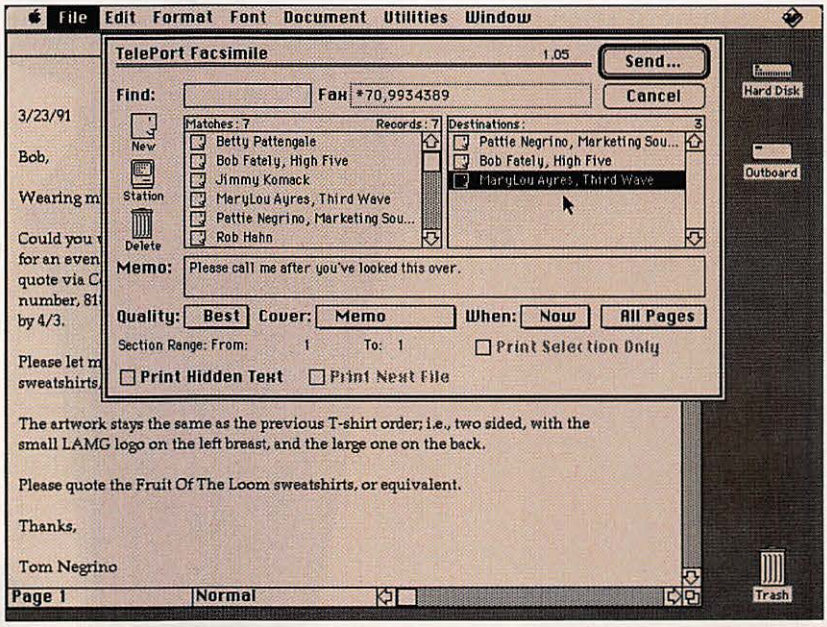
Overall, we found that modems using the Rockwell set were generally the quickest, with the Sierra chip trailing behind.

Fax You Can Live With

In deciding which fax modem to buy, you must consider the usual trade-offs between dollars and convenience. If rock-bottom pricing is your primary consideration, then you might buy the $199 Zoom MX9600S in spite of its lackluster speed and mediocre software.

For Macintosh Portable owners, the PSI Comport is an excellent choice. The fax software that comes with it is superior, and it was a top speed performer. Because of the DataLink LC's poor test results—finishing last in the majority of our speed tests—I can't recommend it. Unless you really need an internal unit for the Macintosh LC, you're better off with a desktop unit.

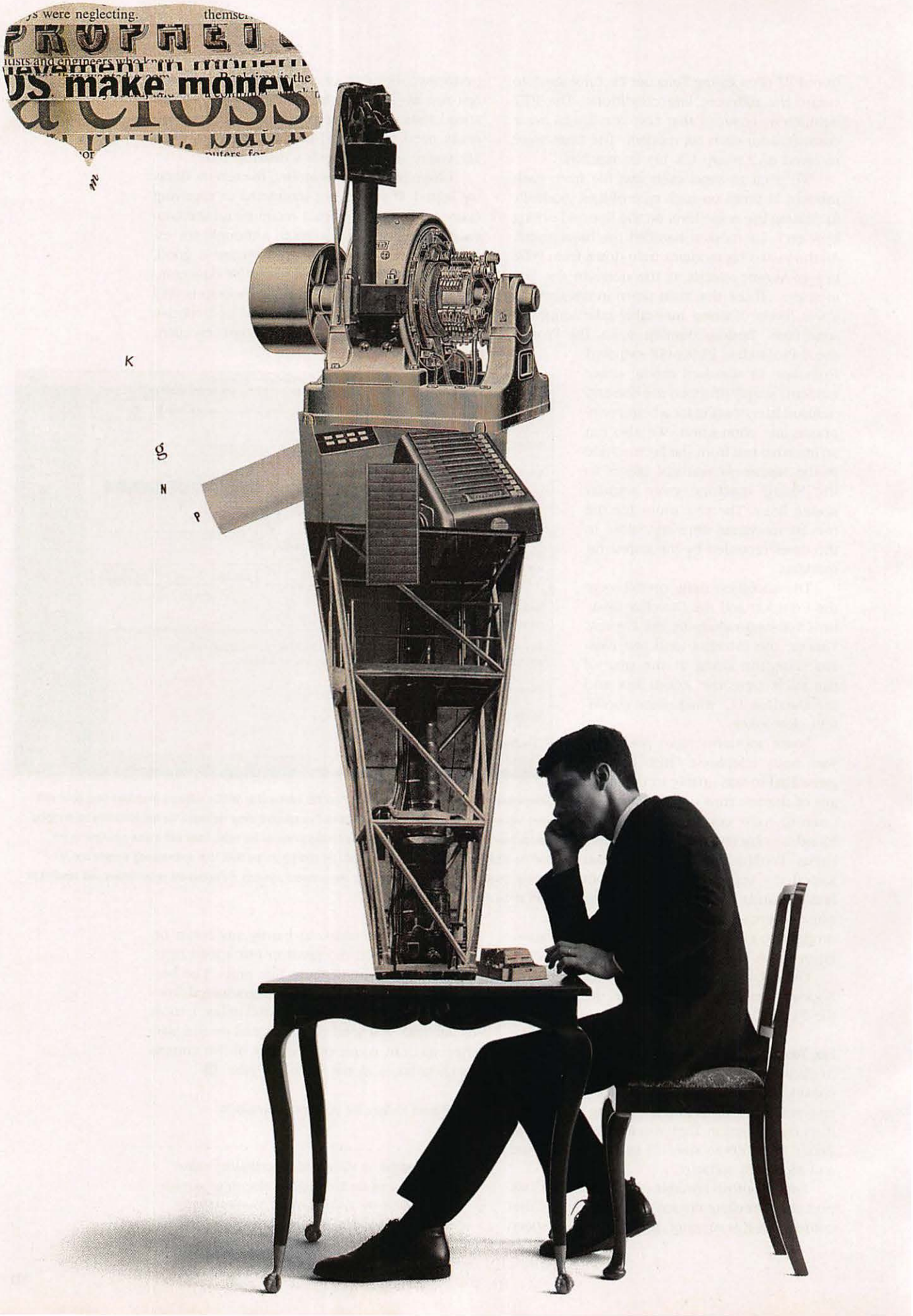
I have two favorites among the ten modems we tested. If you're not interested in receiving faxes, just sending them, I recommend the Global Village TelePort/Fax 9600. Although not especially speedy, the TelePort software is good, the data modem mode includes MNP data compression and correction, and the modem is very easy to set up and use. For send and receive capability, the DoveFax Desktop boasts excellent software, and it takes up hardly any room on your desk. And it did great in our speed tests. I'd buy either one of these fine units. The best news is that fax modems have graduated from the realm of futility to one of solid utility. If most of the faxes you send are generated on the Mac, then you can count on the best of the current batch of fax modems to do the job. M



Teleporting a Fax This Print dialog box from the TelePort/Fax 9600's software illustrates how good software makes sending a fax as easy as printing. I've selected three recipients for my document by dragging names from the list on the left into the Destinations box on the right. I can add a new recipient to the address book (the scrolling field on the left) by clicking on the New icon and entering a name and fax number. Once I click on the Send button, the software converts my document to fax format and sends it to each of the destinations.

See *Where to Buy* for contact information.

***Tom Negrino**, a* Macworld *contributing editor, is a director of the Los Angeles Macintosh Group. His wife, Betty, calls the Mac "our computer teenager" because it's always on the phone.*


were neglecting.
make money

TYPE in Transition Part 2

DESKTOP FOUNDRY

Forging fonts on the Mac

BY ERFERT FENTON

THIS IS THE SECOND IN A FOUR-PART SERIES ON DIGITAL TYPOGRAPHY. THE FIRST, "TYPE RENAISSANCE," WAS A PRIMER ON THE HISTORICAL EVOLUTION OF PRINTING TECHNOLOGY AND THE PRINCIPLES OF DIGITAL TYPOGRAPHY (SEE *MACWORLD*, JULY 1991). THE THIRD ARTICLE, "POSTSCRIPT VERSUS TRUETYPE," WILL COMPARE TWO KEY OUTLINE FONT TECHNOLOGIES FROM A CONSUMER'S PERSPECTIVE. THE FOURTH, "TOP-NOTCH TYPE," WILL BE A GUIDE TO THE TOOLS AND TECHNIQUES FOR ACHIEVING HIGH-QUALITY TYPOGRAPHY ON THE MACINTOSH.

Nowadays, anyone with a Macintosh, a few hundred dollars, and a fair amount of spare time can create a typeface from scratch. Maybe not a *good* typeface, but that's not the point. The tools of a once-mysterious craft are now accessible to anyone who is interested. Today's type-design tools are simple enough for beginners, yet sophisticated enough to meet the standards of most professionals. Individuals can now design, create, and market their own typefaces, something that, until recently, only large type foundries could do.

Some traditional typographers worry that letterform designs drawn with pen and pencil will suffer when they are translated into digital designs. Others grumble about giving type-creation tools to people with no formal training in type design. Is desktop type the end of fine craftsmanship? Or is it the beginning of a new era in type design? Although ghastly faces are indeed being churned out (even as you read this article, someone, somewhere, is hard at work creating an unreadable typeface), the new tools have also encouraged designers to come up with unique faces that might never have been developed in a more commercial environment.

Photograph by Geof Kern

In 1986, Altsys Corporation's Fontographer was the only type-design tool available for the Macintosh. Today it has competition from Letraset USA's FontStudio, Kingsley/ATF's ATF Type Designer I, and URW's Ikarus-M. All four programs give you the tools necessary to create an entire typeface from scratch. All four also allow you to import and edit existing font outlines, as do the type-manipulation programs profiled here in "Transforming Type." If you're new to type design you may want to start out by modifying a few letters of an existing font, or adapting an existing design for a custom logo (as long as you've got permission to do so). Don't be too intimidated; type designers are generally a self-taught lot, so you can learn by doing.

The Design Process

Today's tools haven't changed the process of type design much at all. Most Mac-based type designers still employ traditional tools—brush, pencil, or pen—to draw their initial designs. Type production has certainly changed, however. Until phototypesetting appeared in the 1950s, typographers cut a *punch* (a bar of soft steel in which the image of each letter is created by removing the surrounding metal) for each character in a face. The punch was then driven into a softer metal to create a matrix, or mold (the negative image of the character), into which was poured a mixture of molten lead, tin, and antimony to create metal type. Some type designers did their own punch cutting, while others passed their drawings to type foundries for engraving, stamping, and milling.

These days, the digital typographer crafts letters out of bezier or spline curves, manipulating the points, lines, and curves of character outlines on the computer screen. While punch cutters of yore tested their designs by blackening punches with candle soot and pressing them onto paper, today's type makers click on an on-screen button and wait for a page to roll out of a laser printer. Since these letters are made of digital data, not metal, a designer can make multiple proofs, modifying letters until they're right. Although the procedure varies from one designer, program, or typeface to another, the digital type-production process follows the same basic steps (see "Designing a Typeface").

In a nutshell, the designers use, as they always have, their training and skill to create letterforms, while the computer provides a convenient way to draw, modify, and proof their work. Desktop font-design tools provide a direct way for artists to create, edit, and manipulate their letterform designs, instead of passing on their drawings to other craftsmen who then cast them in metal or create film masters for phototypesetting machines. Designing typefaces requires countless hours of painstaking modification of tiny details, since each letter must not only be perfect by itself, but must work together with all of the other characters in the face. In the words of Frederic Goudy, America's foremost type designer, "When a type design is good it is not because each individual letter of the alphabet is perfect in form, but because there is a feeling of harmony and unbroken rhythm that runs through the whole design, each letter kin to every other and to all."

Once you've created a typeface, you may wish to expand it into a family, adding related styles such as italic or bold. Type-design programs offer features that can help automate the family-building process; you might want, for example, to slant characters to create an *oblique,* or pseudoitalic, face. Or you might use the interpolation feature found in Ikarus-M or FontStudio to produce a medium weight that falls between the light and bold versions you've created. Don't think that you can make the program do all the work, though; in most cases you have to edit a computer-generated variant extensively, and in many cases you have to draw a related style or weight from scratch.

FONT-DESIGN FACE-OFF

Product	ATF Type Designer I	Fontographer	FontStudio	Ikarus-M
Version	1.2	3.2	2.0	2.0
Company	Kingsley/ATF Type Corporation	Altsys Corporation	Letraset USA	URW
Price	$549	$495	$595	$2999[1]
Input methods				
Freehand drawing	●	●	●	○
Scanned template (PICT/TIFF)	●/●	●/○	●/●	●/●
Autotrace scanned template	○	●	●	●[2]
Tablet with crosshair mouse	○	○	○	●
Import formats	PS Type 1, EPS, Illustrator	PS Type 1, 3, EPS	PS Type 1, 3, Illustrator, TrueType	PS Type 1, 3, Ikarus
Output formats	PS Type 1, 3, TrueType, EPS	PS Type 1, 3, EPS, TrueType[3]	PS Type 1, 3, Illustrator, TrueType	PS Type 1, 3, EPS[2], Ikarus, TrueType[3]
Character encoding	●	○	○	○
Hinting	manual	automatic[4]	manual	none
Bitmap editor included	●	●	●	○
Bitmap antialiasing	○	○	●	○
Apply previous kerning values	○	○	●	●
Mirror, rotate, scale, and skew	●[5]	●	●	●
Parts libraries	○	●	●	○
Interpolation	○	○	●	●
Batch processing	○	●	○	●

● = yes; ○= no. [1] Price includes Ikarus-M, digitizer, and Linus-M scan-conversion program. [2] With Linus-M scan-conversion program. [3] Not available when reviewed, but released when System 7 introduced. [4] Manual hinting is available in a separate module. [5] You can rotate a character and its associated template, scale a template directly, or apply transformations to character components.

Now that the basic design procedure has been sketched out, it's time to take a look at the four Macintosh type-design programs.

Fontographer, FontStudio, and ATF Type Designer I all do the following things: allow you to create characters out of points and curves by either drawing from scratch or tracing a scanned template; fine-tune the spacing between certain combinations of characters, called kerning pairs; generate bitmaps and printer fonts; and add hinting instructions for printing at low resolutions. Ikarus-M is a full-featured type-design program of a different sort; it uses its own curve technology and its own format to generate fonts. The key to differentiating these products lies in determining how they implement their common features and in discovering the special options that add unique functionality to each.

All of the programs allow you to generate various font formats: Type 1 PostScript (Adobe's format, which allows you to scale fonts via Adobe Type Manager), Type 3 PostScript (which allows you to add gray scales to characters), PostScript graphics (which let you edit character outlines and add fills or other effects), and TrueType (Apple's new outline font format). For details on which formats each program supports, see "Font-Design Face-off."

Fontographer

Although Altsys Corporation's Fontographer was the first Macintosh-based type-creation program, it has been continually updated and improved to keep pace with changes in type technology.

The program offers three drawing planes: a background plane in which to place scanned letterforms, a foreground plane in which to draw or modify character outlines, and a guideline plane, where character boundaries like the baseline (an imaginary line on which characters appear to rest) and side bearings (the space at each side of a letter) are set. With Fontographer, a scanned image is usually placed, via the Clipboard, into the program's background layer and traced with the pen tool. Input variations are possible, however. One type designer I talked to draws character outlines in Adobe Illustrator (he prefers Illustrator's drawing tools) and imports the EPS files into Fontographer. Fontographer also lets you open existing Type 1 or Type 3 PostScript fonts and modify character outlines or create composite characters.

Fontographer's pen draws bezier curves, the standard method for creating PostScript fonts. Click the mouse button, and the pen lays down a corner point (the point where two line segments meet at an angle); hold down the mouse button while drawing to place a curve point. Like the curves created by PostScript graphics programs, Fontographer's bezier curves consist of

EXTENDING A TYPE FAMILY

Sumner Stone got tired of looking at notes and letters set in Times Roman. So he did something about it. He created Stone Informal, a friendly and casual face designed especially for personal correspondence. Along with Stone Informal, he created the Stone Serif and Stone Sans families while working at Adobe Systems from 1984 to 1990. "When I started at Adobe," says Stone, "there was very little available for the LaserWriter. It seemed like a good idea to do a general-purpose family of typefaces that were developed in the Macintosh environment and would work well with the LaserWriter." The Stone family is an extended family—various styles and weights of a serif and a sans serif family, plus the informal face—made up of faces that share underlying stylistic features.



DAN ESCOBAR

SUMNER STONE'S FACES WERE DESIGNED TO WORK IN HARMONY WITH EACH OTHER AND WERE OPTIMIZED FOR LOW-RESOLUTION PRINTING.

Before working at Adobe, Stone had a varied education that included calligraphy classes and a degree in mathematics. Like Chuck Bigelow and Kris Holmes (who are also profiled in this article), Stone studied calligraphy with Lloyd Reynolds at Reed College. Stone eventually became director of typography at Adobe. He left Adobe in 1990 to start his own type studio, The Stone Foundry, in Palo Alto, California.

He is currently working on a new typeface, which is scheduled to be released this fall. Stone uses Letraset's FontStudio for his work, generally drawing characters by hand and then tracing scanned templates with the program. He has recently begun to experiment with drawing directly in the program, with a fair amount of success.

Stone recently published a book, *On Stone: The Art and Use of Typography on the Personal Computer* (Bedford Arts, 1991). The book presents a general introduction to type design, then shows examples of the Stone faces used in various types of publications. If you're new to typography,

Making letters in some traditional fashion . . . is the route to becoming a type designer

Stone's book provides a practical introduction. But you'll have to do more than read about type. According to Stone, "making and using letters in some traditional fashion—calligraphy, stone-carving, sign-painting, or book design—is the route to becoming a type designer. Type design is an activity that is heavily based on tradition and history; these are cultural objects that we are making."

anchor points on an outline, or *path,* and control points outside the outline. Moving either type of point alters the shape of the curve. When editing a character's outline, you can use tools or menu selections to add corner points, curve points (which connect segments with no change in direction), or tangent points (where a line changes direction).

Fontographer offers an autotrace option, but none of the dozen or so Macintosh type designers and graphic artists I talked to use autotrace, claiming that it takes far longer to correct computer-created glitches and place the points in proper positions than it does to trace characters by hand.

When it's time to generate fonts, Fontographer can produce EPS outlines or Type 1 or Type 3 PostScript. Type 1 is the preferred format these days, since Adobe Type Manager can scale Type 1 fonts. Fontographer lets you add scaling *hints* to fonts to make characters look better when printed at small sizes and low resolutions. (For more about hinting, see "Type Renaissance," *Macworld,* July 1991.)

Because of its excellent manual—which includes a tutorial—and its clean user interface,

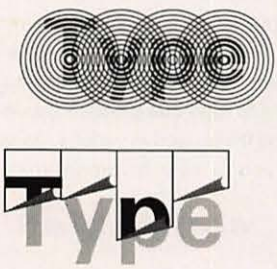
TRANSFORMING TYPE

If a given font doesn't meet your design needs, you can now do something about it. Several programs let you alter character shapes or fills, and many offer canned effects that do everything from placing text on a path to adding perspective or shadows.

Not everyone has the time to design custom fonts. But it's easy to alter existing fonts to meet your design needs. For example, to create a condensed, extended, or oblique version of a face, you can alter an existing PostScript font with Ares Software's FontMonger ($99.95) or Design Science's ParaFont ($99). These utilities can also alter existing fonts to create fractions, old-style numerals, and other specialty characters. If you want to make more radical changes, you can alter character outlines by opening PostScript fonts in the latest version of Adobe Illustrator or Aldus FreeHand; these programs give you access to the points, lines, and curves that make up each character. Illustrator and FreeHand are graphics programs, not font-creation programs. If you want to put your altered character back in font format, use Altsys Corporation's The Art Importer ($149), which converts graphics into characters you can type at the keyboard. Nowadays you can even change the format of a typeface, switching among Type 1 PostScript (Adobe's format, which allows you to scale fonts via Adobe Type Manager), Type 3 PostScript (which allows you to add gray scales to characters), PostScript graphics (which enables you to edit character outlines and add fills or other effects), and TrueType. Ares's FontMonger, Altsys's Metamorphosis Professional ($149), and Image Club Graphics' Evolution ($99) offer a number of conversion options (contact the manufacturers for further details; see *Where to Buy* for vendor information).

The programs listed below offer a variety of canned effects that do everything from placing text on a path to adding perspective, patterned fills, or shadows.

Effects Specialist (Postcraft International, $179.95)



Provides a library of 120 color effects that can be altered in a number of ways. Effects run the gamut from basic gradient fills to outlines shaped like railroad tracks. Effects can also be rotated, skewed, or stretched. Imports bitmapped and Type 3 PostScript fonts. Exports PICT and EPS.

LetraStudio (Letraset USA, $495)



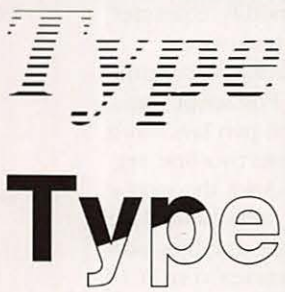
Lets you import and manipulate Type 1, Type 3, and LetraFont-format characters. You surround characters with one of the program's *envelopes* to stretch, skew, rotate, or otherwise distort letters or words. Also lets you set text on a curving path. Exports PICT and EPS.

TypeStyler (Brøderbund Software, $199.95)



Lets you import Type 1 and Type 3 PostScript fonts and reshape characters; add fill patterns or colors; and apply such effects as rotation, perspective, and shadows. Provides tools for combining text with graphic elements. Exports PICT, EPS, and paint.

Smart Art I–IV (Adobe Systems, $99 each)



Prefab effects include variations on perspective, arc, shadows, and rotated or slanted text. Imports Type 3 and Type 1 PostScript fonts. Exports EPS and PICT.

Fontographer is a good program for beginning typographers. But it's sophisticated enough to meet the needs of professional designers as well; many of the fonts offered by small foundries, such as Emigre, Casady & Greene, and the Electronic Typographer, are created in Fontographer.

FontStudio

FontStudio 2.0, introduced in May 1991 by Letraset USA, is similar to Fontographer in many ways. To create fonts using FontStudio, most designers trace a template in paint, TIFF, or PICT formats with the program's pen tool. Sumner Stone (see "Extending a Type Family") was drawing a font directly in FontStudio, but he admitted that it was an experimental project. Like Fontographer, FontStudio lets you autotrace templates if you wish. You also have the option of importing and modifying Type 1 or Type 3 PostScript fonts from other vendors. FontStudio's detailed manual, which includes a tutorial, guides new users through the font-creation process.

In addition to a pen tool, FontStudio offers tools that let you add or delete points and skew, mirror, scale, flip, or rotate a character or part of a character. A library tool lets you store common elements and paste them onto characters where appropriate. Version 2.0 adds an interpolation feature that lets you create intermediate weights or styles between two master designs.

When it comes time to set up kerning pairs, FontStudio lets you adjust letters visually, by dragging characters in a sample-text box, or numerically, by entering numbers for precise spacing into a chart. But the program also provides a unique and wonderful feature called Kern As, which lets you apply the kerning values you've set for one letter pair to similar pairs (you might want to apply the same kerning values to the pairs *ta, te,* and *to,* for example).

As in Fontographer, you can fine-tune bitmaps and add hinting instructions if you wish. FontStudio's bitmap editor outshines Fontographer's, offering such options as color and anti-aliasing (smoothing jagged edges). Although it's a nice bonus, I can't imagine too many PostScript font designers spending hours creating anti-aliased screen fonts—but the capability is there.

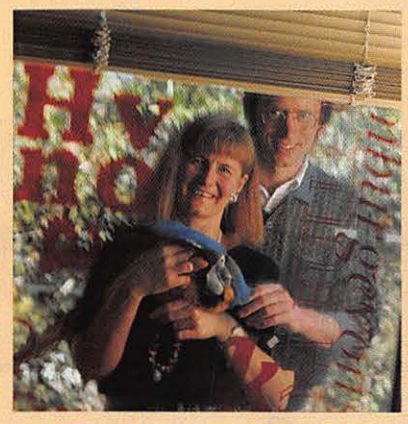
Several of the type designers I interviewed use both Fontographer and FontStudio. Most spoke highly of both programs. Several of the designers preferred FontStudio's pen tool to Fontographer's, claiming that it offers slightly finer control over an outline's shape.

ATF Type Designer I

Kingsley/ATF Type Corporation's ATF Type Designer I enables you to import and modify existing PostScript fonts or trace scanned PICT or

FINDING THE RHYTHM IN TYPE

Like many type designers, Chuck Bigelow and Kris Holmes started out with calligraphy. When Holmes talks about making type, it's obvious that calligraphy has influenced her designs; she speaks of liveliness, rhythm, asymmetry, and curves springing from stems. Holmes and Bigelow started their studio in 1976. In 1977 Bigelow read about the first Xerox bitmapped laser printer and realized that digital typography was on its way. Holmes saw the potential of digital type when she worked for a time at Compugraphic, where the first Ikarus font-creation system in the United States had just been installed. The Bigelow & Holmes Foundry now has three Ikarus workstations: running on a VAX, a Sun workstation, and a Mac IIx.



DAN ESCOBAR

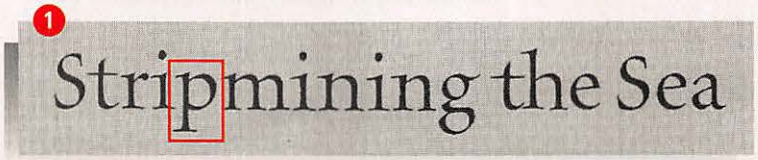
DESIGNERS CHUCK BIGELOW AND KRIS HOLMES CALL ON THEIR CALLIGRAPHIC TRAINING TO DESIGN TYPEFACES.

In the 1980s Bigelow and Holmes began work on a typeface called Lucida. Lucida's bold strokes, large x-height (the height of the lowercase letters without ascenders or descenders), and polygonal serifs made it an ideal laser printer font. Technology changed rapidly, and Adobe's hinting strategy made Lucida's bold structure somewhat unnecessary. But a more recent technology has come around to redeem Lucida; it turns out that Lucida holds up extremely well under that most adverse of printing conditions—the fax. The Lucida superfamily now includes more than two dozen styles and weights; one version of Lucida can be seen in the pages of *Scientific American,* and another is packaged with Sun computer workstations. Bigelow and Holmes's most recent project was converting four bitmapped Macintosh fonts to TrueType format for Apple.

Their advice to beginning type designers: study calligraphy. "It's not that informative to simply copy existing typefaces," says Holmes. "You have to learn the roots of letters." Bigelow agrees, adding that you should study the history of typography as well as its calligraphic roots. "Many of today's 'avant-garde' faces are rehashes of mediocre faces of 30 or 40 years ago. To make a really innovative face, you have to understand the rules of tried and true type design, then set out to break at least one of those rules."

To make a really innovative typeface, you have to understand the rules of type design, and then break at least one

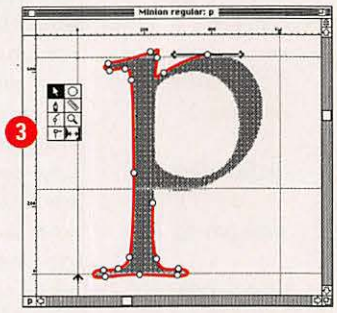
DESIGNING A TYPEFACE



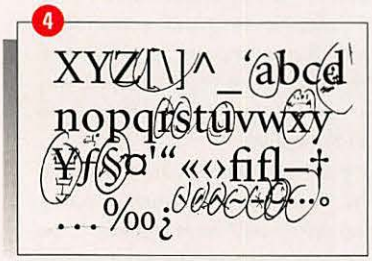
1) Many typeface designs are based on hand-drawn characters. In this example, designer Robert Slimbach's Minion starts out as calligraphy.



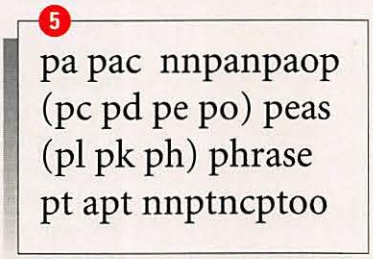
2) Individual characters are photographically enlarged and touched up so that the best possible letter is used as a model.



3) The photographs are then scanned. Each scanned character is placed in a background, or template, layer of a type-design program and traced with the program's pen tool.



4) After creating each character, the designer prints proofs and begins refining the characters, working on individual letterforms and on how each letter relates to the others. Many proof sheets are made during the design process as the designer evaluates the face's overall appearance and adjusts the characters and spacing.



5) Once the characters are in good shape, the designer fine-tunes the spacing between sets of characters, called kerning pairs. Some faces have a few hundred kerning pairs, while others contain more than a thousand. It's up to the designer to decide how many kerning pairs a particular typeface needs.



6) Finally, the face is finished. The type designer may have the type-design program add hints, instructions for modifying the characters' outlines, to optimize the typeface's legibility and design for low-resolution devices like 300-dpi laser printers (see "Type Renaissance," *Macworld*, July 1991). The program then generates the fonts in the required formats.

TIFF templates with a pen tool in the program's Contour Editor. The pen tool lays down curve points unless you press a modifier key while drawing: press the shift key to place tangent points, the ⌘ key to draw straight lines, or the option key to place corner points. The program's knife tool lets you cut contours or add points to a character's outline. A ruler lets you set character guidelines such as side bearings, and displays the coordinates of the pointer's position.

You can combine components from several characters and rotate, scale, skew, or flip a character or part of a character. You can also build and edit bitmaps, add hints, and generate fonts in a variety of formats. In addition to Type 1 and Type 3 PostScript, ATF Type Designer I can generate fonts in Apple's new TrueType format. An Encoding Editor lets you give characters unique names and assign them to any keyboard position—a handy feature for foreign-language fonts.

Although ATF Type Designer I offers online help, it's not enough to compensate for the program's dismal manual and convoluted user interface. The manual is poorly organized and offers no tutorial; as I slogged through it, I kept asking myself, When will I get to the part where they tell me how to use the program? I never did. The program's rigid template- and file-naming conventions didn't help matters; they reminded me of DOS.

In short, at the heart of ATF Type Designer I lies a decent font-creation program, but in my opinion it's not worth the trouble entailed in mastering it, especially when well-designed programs like Fontographer and FontStudio are available.

Ikarus-M

URW's Ikarus-M takes a very different approach to type design than the three programs just described. For starters, with Ikarus-M you use a digitizing tablet and a four-button mouse with a crosshair sight to trace drawings or photo reproductions of characters, rather than tracing a scanned template on the screen. A utility called Linus-M offers raster-to-vector (bitmap-to-outline) conversion, and you can import Ikarus-format fonts or import PostScript Type 1 or Type 3 fonts. Ikarus-M doesn't use the anchor and control points of bezier curves; instead it creates an outline where all points are on the path itself. For best results, you should mark curve, corner, and tangent points in advance on the hard copy you're tracing.

If you're accustomed to working with bezier curves, Ikarus-M takes some getting used to. But once I grew familiar with the new way of drawing, I found that Ikarus-M offers an extremely precise way to digitize characters. Once you've

drawn a character, you can apply familiar transformation operations such as flip, mirror, rotate, or skew. Although Ikarus-M isn't as easy to use as FontStudio or Fontographer, I was pleasantly surprised to find that its excellent manual made it fairly easy to use.

In addition to its precise digitizing capabilities, Ikarus-M offers the ability to interpolate a new font weight between two existing weights, creating, for example, a semibold font from a light and a bold one. You can save Ikarus-M fonts in the proprietary Ikarus format or ask the program to generate Type 1, Type 3 PostScript, or TrueType fonts.

Although Ikarus-M is an impressive program, it's not for the casual user. Its price tag (which includes the digitizing tablet, the specialized mouse, and the Linus-M scan-conversion program) puts it at the high end of the scale. Actually, Ikarus-M is more of a production tool than a creative tool; you wouldn't want to use it to draw characters from scratch, for example.

Picking a Program

Which program is the right one? In my opinion, Ikarus-M is a high-end option for professional type designers and production houses. For most designers it's a toss-up between FontStudio and Fontographer. If you want a high-quality bitmap editor, interpolation, or want to save time by accessing a parts library or applying kerning information to multiple pairs, you might prefer FontStudio. And if you're one of those people who prefer Illustrator's pen tool to Aldus FreeHand's (I'm not), you might have a preference for FontStudio's comparable pen.

All the programs discussed here can turn out good-looking type. But it's not the programs that create the type—it's the designers. If you're serious about type design, take a trip to a library or bookstore and read about type; the bibliographies you're sure to find will point the way to additional sources. Use a type-design program or font-conversion utility to dissect existing fonts, and see how the pros construct them. But most important, try your hand at type design. Who knows, you might be good at it. And even if you're not going to be immortalized as a typographic genius, you can at least create a custom logo, letterhead, or typographic ornament. ■

See *Where to Buy* for contact information.

Erfert Fenton *is a technical writer and bon vivant who resides in Silicon Valley, where they're not really sure what a bon vivant is. She's a* Macworld *contributing editor and the author of* The Macintosh Font Book, *now in its second edition (Peachpit Press, 1991).*

RUNNING A FOUNDRY FROM HOME

Judith Sutcliffe does what many Mac-based type designers dream of doing: she runs a successful type-design and production business out of her home. In her pre-Macintosh days, Sutcliffe worked as a calligrapher. She moved to Santa Barbara, California, in 1978 and became a tile muralist, painting decorative tiles for homes and public buildings. Since some of the public plaques she worked on required inscriptions, she acquired all the books she could find on lettering and type. Her fascination with type led her to purchase two letterpresses, which she has to this day. Sutcliffe is primarily self-taught, although she studied the book arts with typographer Roger Levenson in Santa Barbara. In 1984 Sutcliffe purchased a Mac, and in 1985 she received a prerelease version of Fontographer from Altsys. Her first face was Goudy Newstyle, a digital re-creation of a relatively rare face by Frederic Goudy. "It was good training to copy a typeface," says Sutcliffe. "In copying the face, I had to look carefully at every curve and angle." Unlike most digital typographers, Sutcliffe draws directly on the Mac instead of initially scanning a preliminary drawing and then tracing it in a font-creation program. She figures out the general proportions of the letters, draws them on screen, then prints proofs and refines the letters until she's satisfied with them.



CYNTHIA MOORE

SELF-TAUGHT TYPOGRAPHER JUDITH SUTCLIFFE RUNS HER FOUNDRY, THE ELECTRIC TYPOGRAPHER, OUT OF HER HOME.

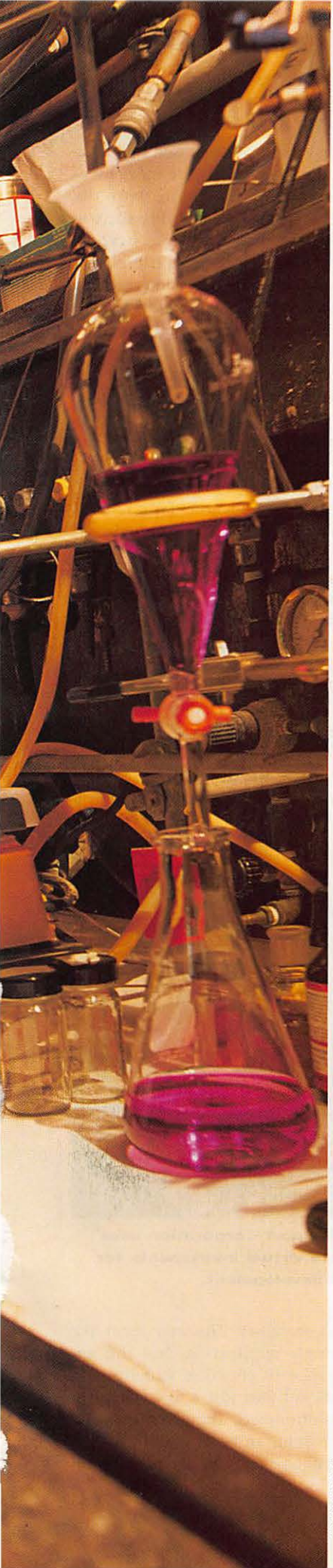
Sutcliffe's other offerings include two additional Goudy faces, several calligraphic faces, and some decorative initial capitals. She runs her business, The Electric Typographer, out of her home, keeping overhead low. She keeps the packaging simple, printing up covers on a LaserWriter and copying disks when orders come in. She doesn't advertise her fonts, relying instead on word of mouth and the occasional mention in a publication. "All I need to run my type-design business is UPS and a little space," says Sutcliffe.

All I need to run my type-design business is United Parcel Service and a little space

"I don't make a lot on each font disk, but if I get the entire $79.95, that is a heck of a lot more than if I only get 15 percent of the wholesale price." Aspiring type designers can take heart from Judith Sutcliffe's success; she has shown that it's possible for an individual to make it in a business that was once the province of established type foundries.



David Nugiel, a chemist at Du Pont Merck Pharmaceuticals, uses CAChe, a Mac-based molecular-modeling system, to investigate how the immune system responds to drugs.



MANUELLO PAGANELLI

Science

Leading-edge labs use the Mac as their window on the world of data

AND THE MAC

THE MACINTOSH, YOU MAY BE SURPRISED TO LEARN, IS THE COMPUTER OF CHOICE IN A WIDE RANGE OF ADVANCED SCIENTIFIC LABORATORIES. ON THE MAC, BIOCHEMISTS GENERATE GENETIC MAPS AND CHEMISTS CONSTRUCT THREE-DIMENSIONAL IMAGES OF COMPLEX MOLECULES. EVEN ASTROPHYSICISTS, WHOSE COMPUTATIONAL LOADS REQUIRE SUPERCOMPUTERS, TURN TO THE MAC AS THE BEST MACHINE TO TRANSFORM COMPLEX DATA INTO EVOCATIVE COLOR GRAPHICS.

THESE DAYS, NEARLY ALL MAJOR SCIENTIFIC SOFTWARE PACKAGES APPEAR IN A MACINTOSH VERSION. A LARGE FRACTION OF THE MOST SIGNIFICANT PRODUCTS ORIGINATE ON THE MAC, AND OFTEN GO NO FURTHER. WITH MORE POWERFUL MACHINES OUT THERE, WHY THE MAC? IN THIS ARTICLE I EXAMINE THE WAYS RESEARCHERS USE THE MAC'S GRAPHICS CAPABILITIES TO "SEE" KEY INFORMATION OFTEN BURIED IN LISTS OR TABLES OF DATA.

HUMBLE BEGINNINGS WHEN THE MAC FIRST APPEARED, ONLY A VISIONARY COULD HAVE RECOGNIZED THAT IT WOULD HAVE A MAJOR IMPACT IN THE WORLD OF SCIENCE. IT WAS PATHETICALLY UNDERPOWERED FOR NUMERICAL COMPUTATION, OFFERED ONLY BLACK-AND-WHITE GRAPHICS, AND LACKED A BUS INTERFACE FOR DATA ACQUISITION.

by Charles Seiter

Yet a few savvy developers saw a future for the Mac in science. Just as desktop publishing applications put Macintoshes into the mainstream corporate world, early versions of Cambridge Scientific Computing's ChemDraw (which now lists for $595) and SoftShell International's ChemIntosh (now $595) gave the Mac a foothold in chemistry. These chemical-structure drawing programs freed scientists from endless hours of drawing chemical figures by hand.

Many of the most significant scientific software applications originate on the Macintosh, and often go no further

And by adopting Macintoshes en masse as easy-to-use instructional machines, universities ensured that other, more-powerful scientific programs, such as Mathematica ($595 for a version that runs on any Mac, or $895 for an enhanced version for Macs with math coprocessors) from Wolfram Research; LabView 2 ($1995) from National Instruments; SYSTAT ($795) from SYSTAT; and most tool kits for numerical computation in FORTRAN, C, and Pascal would be implemented most widely on the Mac.

Finally, when the Mac II with NuBus slots and later the IIfx with near-workstation performance levels became available, the visionaries saw even greater rewards for their pioneering work. Scientists deployed Macs in nearly every discipline.

The New Biology

One science initiative of the 1990s, comparable in scope to NASA's moon launch during the 1960s, is the Human Genome Project. The scores of labs and hundreds of scientists involved in this multibillion-dollar effort hope to draw the human genetic map down to the order of the building blocks of DNA—the four nucleic-acid bases as they are arranged along the DNA molecule's double-helix shape (see "Creating a Gene Map"). This sequence constitutes the chemical basis of heredity.

Locating a small gene (which is composed of perhaps 200 bases) and then deciphering its structure can be a lengthy and complex process. The entire human genome consists of many thousands of genes—hundreds of millions of bases—making the Human Genome Project by far the most ambitious venture in the history of biological research. To make the project logistically and financially practical, new and efficient ways to collect and organize DNA-sequence data must be found. This is where Macs play a significant role.

Textco's Gene Construction Kit (GCK) is one of the most popular programs for DNA-sequence analysis. This $895 application offers extensive features for strategic experiment planning and analysis. Using GCK, a researcher can call up a representation of one of the circular pieces of DNA (called plasmids) typically used to insert foreign DNA into bacteria. The program finds all the spots along the circle where special proteins (called restriction enzymes) can be used to cut the DNA, leaving "sticky ends" into which another piece of DNA can be attached, or *spliced*.

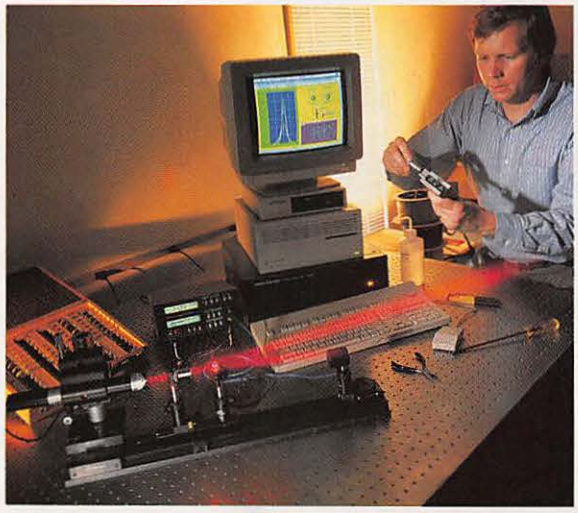
Gene Construction Kit lets researchers maintain a library of models of DNA fragments used to design and test splicing and *cloning* experiments (in which large amounts of a given DNA fragment are produced for further study) on the Mac screen before committing to days or weeks of lab procedures. And GCK lets researchers use the Mac's superior graphics abilities to produce journal-quality annotated genetic maps for reports and articles.

Pharmaceutical researchers also use molecular biology techniques to investigate a range of large and complex cellular products (such as peptides and polynucleotide fragments) that could be used for therapeutic purposes. These substances have little in common with the small-molecule drugs synthesized in traditional organic chemistry. To tackle the challenge, David Brown at Abbott Laboratories uses International Biotechnology's MacVector ($2495). He relies on the program's array of structure-prediction features.

For example, researchers often need to predict the therapeutic uses of the proteins that the body produces according to the instructions of certain genetic sequences. These proteins may, for example, help fight off viral or bacterial infection. Typically, it's easier to determine a genetic sequence than to sequence small amounts of protein. MacVector offers a tool kit for predicting the structure of the protein based on its DNA sequence, then predicts the protein's solubility, and ways to purify it—saving lab time and space in the process.

Chemical Computation

At the simplest level, chemists use the Mac extensively to produce the little hexagons that fill most articles in organic chemistry. This may seem like a simple application, but the appearance of chemical structures in PostScript files just a few years ago revolutionized chemistry journal publishing and helped Macs proliferate at chemical and pharmaceu-



MANUELLO PAGANELLI

Scott Jordan of Newport Corporation uses LabView 2 to create virtual instruments for laser research and development.

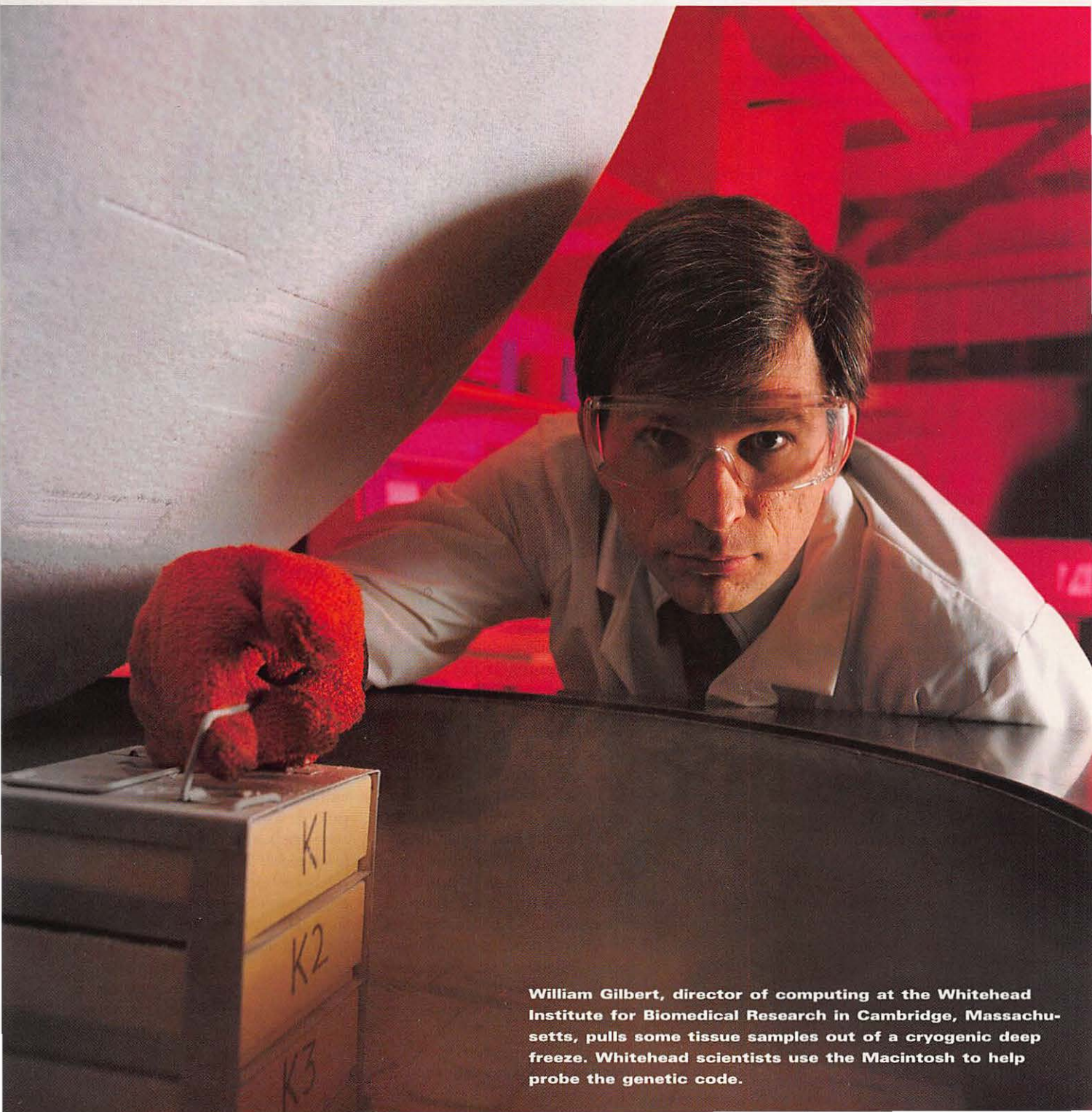
BILL O'CONNELL

tical companies (see "Paper Chemistry"). Eli Lilly and Du Pont, for example, may be the two biggest Macintosh end-user sites on the planet, with more than 40,000 Macs each.

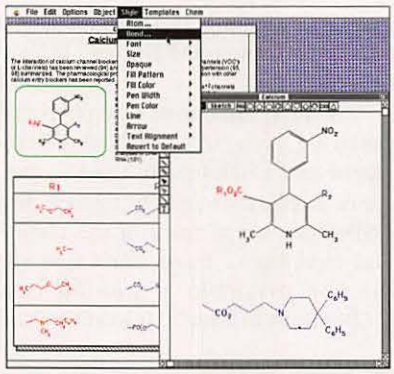
When a computer can translate a drawn structure into a code, it can search minicomputer chemical databases that contain records for more than half a million compounds. Intelligent chemical software could find and investigate research leads in the wealth of literature now encoded online at chemical information services and in corporate databases.

ISIS/Draw, from the largest chemical-information software company, Molecular Design Limited, represents the first Mac implementation of this kind of chemical search software, formerly available only on minicomputers. Though still in testing at this writing, ISIS/Draw will be a major step forward for the Mac in chemistry.

At first, ISIS/Draw resembles the drawing programs, such as ChemDraw and ChemIntosh, used to prepare publication-quality figures. But ISIS/Draw keeps track of the chemical meaning of molecular fragments as you assemble a drawing (see "Chemicals in View"). It won't let you



William Gilbert, director of computing at the Whitehead Institute for Biomedical Research in Cambridge, Massachusetts, pulls some tissue samples out of a cryogenic deep freeze. Whitehead scientists use the Macintosh to help probe the genetic code.



Chemicals in View ISIS/Draw goes beyond other chemical-drawing programs because it understands the chemical meanings of molecular fragments. The program automatically places bonds and hydrogen atoms as you draw each figure, and it will not allow incorrect structures.

draw incorrect structures. The program automatically places bonds and hydrogen atoms where they belong.

Because it keeps the coded information about the chemical structure, ISIS/Draw can communicate with programs that manage databases of structures and reactions, and minicomputer programs can export structures in a standard format that ISIS/Draw can display and analyze. Because structures are always interpreted as objects with associated codes, not simple PICT files—each drawing session or database search can be saved to a chemist's personal database and reused.

Molecular Design

The most challenging computer application in chemistry involves molecular design. This task strains the Macintosh's computational limits. Macs easily display and rotate dual chemical-structure images (scientists then use special glasses for a 3-D effect)—no small job. But computation and display of surface-charge maps—the electrical charges on the surfaces of drug molecules that affect their pharmaceutical properties—call for much more power (see "Surface Charge").

Tektronix solved this problem with CAChe WorkSystem ($13,000 to $55,000, based on configuration), a molecular modeling system that includes a NuBus-based RISC RP88 coprocessor accelerator that runs about 12 times faster than a Mac IIfx.



PETER EISENBERGER

Stephen L. Buchmann, a research entomologist in Tucson, Arizona, uses Mathematica and his Macintosh to chart the foraging patterns of bees.

David Nugiel of Du Pont Merck Pharmaceuticals uses Tektronix's CAChe system to investigate a fundamental question about the way the immune system responds to drugs. Pharmaceutical chemists often want to produce antibodies—the large proteins the immune system generates to fight off viruses or any other foreign invader—that target drugs. CAChe can help them, for example, create diagnostic tests, design drugs, or measure drug concentration.

But because drugs are usually small molecules that don't stimulate much antibody production, chemists link the drugs to proteins that are sure to cause the immune system to take notice. Highly selective antibodies (called *monoclonal* because they are the products of a single cell line) can then be grown in the lab to target both the carrier and the linked drug.

An outstanding research question is, Which small chemical variations will look similar enough to the original drug to be recognized as nearly the same molecule by the immune system, and thereby stimulate an immune response? Such research might yield look-alike drugs that retain or augment benefits of the original, with fewer side effects.

Nugiel produced monoclonal antibodies to target the drug fentanyl, a surgical analgesic and tranquilizer, with the aim of ultimately reducing side effects (allergic response, for example). Antibodies for fentanyl reacted with three fentanyl derivatives

but, in a possible clue to side-effect-free derivatives, showed no reaction to five others. When this situation occurs, a chemist wants to look for a structural pattern in the compounds.

Nugiel chose CAChe to help see the patterns. CAChe calculated the most likely conformations—the 3-D shapes of the molecules—for all eight derivatives. It became apparent that the three reactive derivatives could superimpose almost exactly on the original fentanyl molecules, while the five nonreactive derivatives had distinctive 3-D conformations that just didn't fit in the space occupied by fentanyl. This failure to fit amounted to a computer confirmation that the immune system wouldn't see these five as fentanyl equivalents. These five derivatives are therefore less likely to provoke an unintended response than the three fentanyl look-alikes.

This work points the way to more-efficient molecular design for diagnostic and therapeutic purposes; computer models can rule out bad ideas and suggest fruitful ones for expensive and time-consuming lab tests. It also confirms that a Mac with a powerful accelerator can usurp the functions of a scientific supermini, and that a standard Mac color display can be an acceptable substitute for a dedicated graphics terminal.

Although Du Pont's experience with CAChe shows the computational benefits of a Mac souped up with a RISC engine, chemists mainly interested in viewing molecules in 3-D should consider the lower-cost (though slower and less versatile) alternatives—Alchemy II ($950) from chemical software pioneer Tripos Associates, and Chem3D ($595) from Cambridge Scientific Computing.

The Physics Challenge

Physics was the first science application for computers, but it was nearly the last for the Mac. Physicists depend on access to the biggest and fastest computers available; the market for supercomputers, for example, depends heavily on orders from physicists in government laboratories. Many studies in computational physics call for about 400 times the number-crunching speed a standard Mac II can muster (see "Numbers Game").

Fortunately, many other applications fit into the capabilities of a II-series Mac. A IIfx can handle the same type of computations in Mathematica as a Sun workstation can. Any color Mac can do a dazzling job of data visualization with programs from Spyglass, and the data-acquisition capabilities and programmable data interface available for the Mac from National Instruments are spectacularly effective.

Physics researchers who study general relativity perform computations (called *tensor* calculations) that contain hundreds or even thousands of mathematical terms. A single mistake in any part of the calculation, however small, can make any overall conclusion meaningless. This problem is not hypothetical. When the first symbolic-math programs became available, researchers found that many accepted results in physics and mathematics contained serious errors.

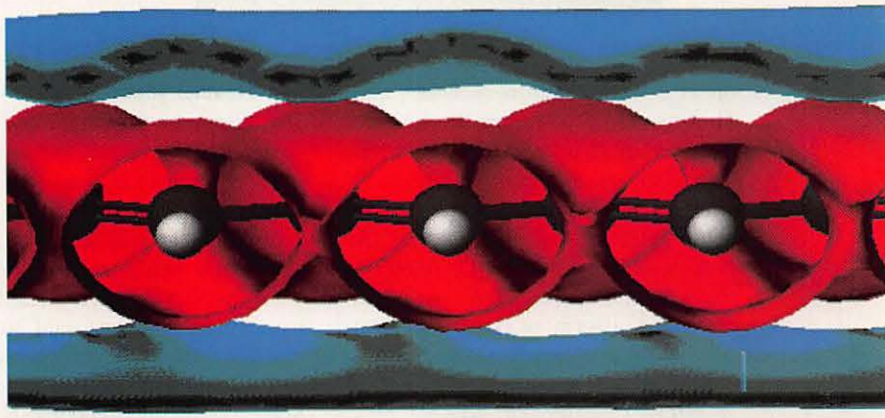
Several companies offer symbolic-math programs for the Mac. Maple ($395) from Brooks/Cole Publishing

Numbers Game

The Mac can easily handle the database and mapping chores of molecular biology and can display chemical structures or even complex color graphics without much delay. But to perform the vastly more complex computations that produce graphics for, say, charge maps of molecules or space-time curvature profiles of black holes, even the Mac IIfx is a dog.

Speed for most physics or chemistry computations is measured in megaflops (MFLOPS), an acronym for million floating-point operations per second. A floating-point calculation involves decimal places rather than integers. Floating-point operations take more time and memory than integer operations do; they're the reason the Macintosh requires math coprocessors for serious scientific calculations.

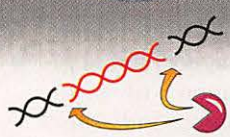
A standard Mac IIx is rated at 0.4 MFLOPS, and the IIfx is rated at close to 1.0. By comparison, a low-end RISC-based Sun is rated at 1.2 MFLOPS, the Intel i860-based supermini at 10, and a four-processor Cray X-MP at 200. Macs can be customized to speeds respectable in the workstation world, however, by using multiple fast (50MHz) 68040 processors, or the RP-88 family of accelerators used with Tektronix's CAChe system. Either method gives a Mac 4 to 9 MFLOPS, depending on configuration.



Surface Charge CAChe WorkSystem, from Tektronix, allows chemists to map the distribution of electrical charges on the surface of a molecule. This requires calculations so complex that as recently as two years ago, it would have been attempted only on a supercomputer. The above figure shows a molecular model of a conductive polymer. The black dots represent the chain of carbon atoms that form the backbone of all such plastics. The red circular forms surrounding the carbon atoms represent areas of high electron density. The blue zones above and below indicate areas with fewer electrons. In this configuration, one of many being studied for possible use as a semiconductor, the polymer conducts electricity along the length of the carbon chain, but not through any cross section.

Creating a Gene Map

1 **Molecular biologists use the Macintosh to map genes—the building blocks of heredity for humans and all other living things. These maps elucidate the structure and function of our genetic makeup and provide a starting point for therapies to cure genetically linked diseases. The DNA in chromosomes, or *genomic DNA*, is composed of double-helix-shaped molecules, made up of infinitely varying combinations of four nucleotide bases—guanine, cytosine, thymine, and adenine. Pairs of these nucleotides, called *base pairs*, hold the two strands of the double-helix together.**



2 In the first step toward mapping a segment of genomic DNA, biologists use trial and error to find an appropriate *restriction enzyme,* a protein that cleaves the genomic DNA, producing a piece—perhaps a few hundred base pairs—that can be surveyed efficiently.



3 Biologists then search a Macintosh database for a suitable *plasmid,* a circular piece of DNA that serves as a vehicle to prepare genomic DNA for the mapping process. A piece of the selected plasmid is then removed using the restriction enzyme (above).



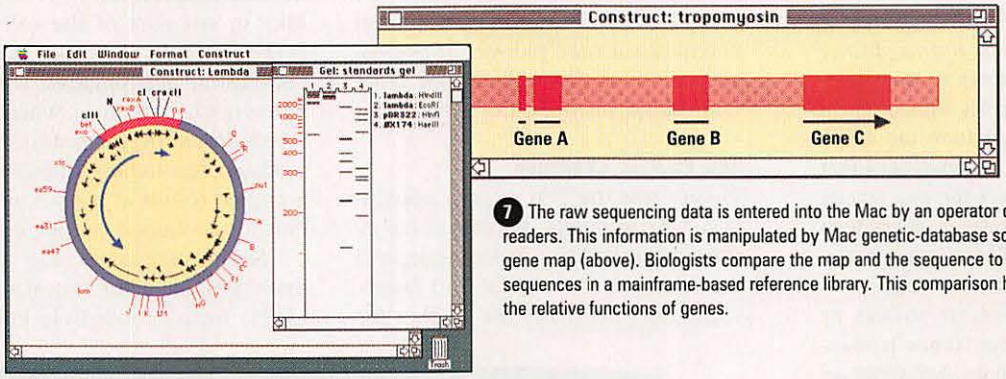
4 In place of the removed section, scientists *splice* the piece of genomic DNA into the plasmid, creating a *recombinant*, or genetically engineered, hybrid plasmid (above left). Biologists then insert the plasmid into a strain of bacteria (above right).



5 The plasmid multiplies rapidly, making many copies of itself and the genomic DNA. This *cloning* process produces the large amount of genomic DNA needed for mapping. The same restriction enzyme is then used to separate the genomic DNA from the plasmids.



6 The purified genomic DNA is run through a *sequencing gel* (above) in an apparatus that uses electric fields and radioactive chemical markers to chart the order of the four nucleotides within the segment of DNA (right).



7 The raw sequencing data is entered into the Mac by an operator or by special sequence readers. This information is manipulated by Mac genetic-database software (left) to produce a gene map (above). Biologists compare the map and the sequence to other gene maps and sequences in a mainframe-based reference library. This comparison helps scientists determine the relative functions of genes.

offers a huge range of facilities, and Theorist ($399.95) from Prescience features an intuitive, true-Mac interface. But Mathematica, which is comprehensive and supplies versatile color graphics, has become the de facto standard in American universities. Mathematica also supports *packages,* a form of documentation combining graphics, text, and active computational programs.

Steve Christensen, adjunct professor of physics at the University of North Carolina and cofounder of MathSolutions, developed the program MathTensor as a Mathematica package to bring the most sophisticated methods in computational physics to the desktop. MathTensor users can exchange calculations interactively, checking and extending each other's work on screen.

The Weather Mac

The next time you curse the TV meteorologist, consider the amount of data represented by a satellite weather picture of the United States. To characterize the atmosphere, you need to know the temperature, pressure, wind speed and direction, and humidity values for every data site. How many are there? If you consider data at 1-mile intervals, to cover the United States you would need about 1000 by 3000 sites, giving you a data set of 5 values times 3 million sites, or about 15MB of data for every time the values are taken. And 1-mile spacing is not good enough for long-term weather prediction. If you collect data at one-hour intervals, each day yields 360MB of data. And that assumes you don't log data at different altitudes for each location!

Handling and interpreting such massive data sets routinely confronts Ted Habermann, a geophysicist at the National Oceanic and Atmospheric Administration (NOAA). Clearly the Macintosh is not the right computer to store or analyze multimegabyte data sets. But Habermann uses a pair of Macintosh programs from Spyglass (whose developers originally were associated with the National Center for Supercomputing Applications near the University of Illinois). With some ingenuity in programming displays, the Spyglass products help researchers understand large data sets at a glance.

NOAA uses these tools extensively in its quality control of reported atmospheric data. In a color-coded (called false-color by atmospheric scientists) U.S. map of temperature

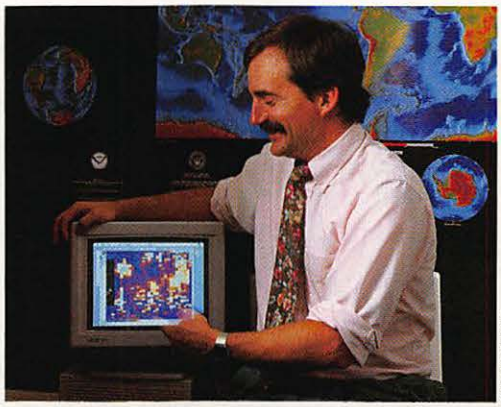
data, for example, a nonfunctioning reporting station can be made to stand out in Spyglass's Transform ($495) as a green dot (the program lets you adjust its color table) against a red background—easier to spot than a few anomalous values in a printout of 10 million numbers.

Spyglass Dicer ($495) lets researchers inspect cross sections of a 3-D data set. Researchers can construct a set of views showing, for example, ocean currents through an imaginary window in the sea, then analyze or sort the numbers in interesting regions using Transform.

The Spyglass products are unique. They have made the Mac a researcher's mainstay for visualizing large sets of dynamic data—from fluid dynamics to weather prediction.

Optical Options

Many aspects of optical research—from determining the degree of laser-beam focus to testing the performance of optical components—call for meticulous, repeated measurements. LabView 2 elegantly automates this tedious data collection.



GEOFFREY WHEELER

Geophysicist Ted Habermann at the National Oceanic and Atmospheric Administration in Boulder, Colorado, uses Macintosh software to map and evaluate U.S. temperature data.

The key to the LabView 2 approach is the *virtual instrument,* a software tool kit for constructing what appears to be the front panel of a scientific instrument on a Macintosh screen. Icon-based programming then lets users operate scientific equipment using the Mac screen as if it were the instrument control panel.

Scott Jordan, applications scientist at Newport Corporation, uses LabView 2 to develop lasers and optics for research and industry. To test his optical-bench equipment, Jordan just clicks on a button on the LabView 2 virtual-instrument screen. Another virtual instrument manages alignment for splicing two optical fibers end-to-end; yet another takes a cross section of a laser beam and matches it on screen to an ideal shape. LabView 2 virtual instruments combine with a Newport three-axis motion controller to replace expensive special-purpose real instruments for such tasks.

Newport has also developed a virtual laser-micromachining station. Jordan again combines a motion controller, LabView 2, and an off-the-shelf laser. This time he creates a CAD-like system for laser etching integrated-circuit masks or microscopic machine parts in silicon. A few years ago micromachining was investigated at only a handful of universities; now anyone with a Mac, LabView 2, and an optical bench can explore micromachining's commercial possibilities.

The Big Picture

Whether mapping the human genome or the weather, or building new chemicals or models of general relativity, the Macintosh has established itself in science on its strength in graphics. And despite market challenges from UNIX-based workstations, the Next computer, and faster PCs, the Macintosh has steadily expanded its presence in all the sciences.

And after the marketing noise about multimedia finally dissipates, after System 7 becomes a routine fact of life instead of an amazing novelty, the Macintosh will still be finding new work to do, every year, in laboratories around the world. ■

See *Where to Buy* for contact information.

Contributing editor **Charles Seiter** *designs scientific equipment and software for a consortium of chemistry and biochemistry companies.*

Paper Chemistry

Chemists tend to think and write in pictures—successful chemists nearly always have strong visual imaginations. This makes for unique documentation problems. Before the Macintosh appeared, chemists either drew their own structures using plastic templates or waited for technical illustrators to turn freehand sketches into publication-ready figures. Preparation of an organic-chemistry Ph.D. thesis meant that a graduate student typically spent weeks, if not months, patiently drawing complex figures, or paid several thousand dollars to have figures drawn by a service.

Enter ChemDraw from Cambridge Scientific Computing and ChemIntosh from SoftShell International in the mid-1980s. They changed structure drawing forever. The first versions of these programs provided simple templates and basic structure-drawing tools. More important, they offered the then-astounding novelty that drawings could be pasted directly into word processor text. This feature alone put thousands of Macintoshes into academic chemistry department offices and chemical-research firms across the country at a time when the Mac was perceived as a toy by many in science and business.

Current versions of these programs offer large libraries of chemical clip art, graphic equivalents of style sheets, and drawing capabilities for exotic situations (ChemIntosh II, for example, has drawing tools for illustration of molecular orbitals and electron-transfer paths). As standards emerge in the next few years, Mac-based chemists should be able to exchange information between programs and communicate with chemical databases directly from their favorite drawing programs.

POLISHING YOUR PROSE

BY CHARLES PILLER

Are grammar and style checkers worth the trouble?

Does anyone ever feel completely satisfied after writing an article, a report, or even a business letter? Although many people do need a lot of help with their writing, and even the best writers can use editorial assistance, few of us enjoy the luxury of having a good editor whenever we need one.

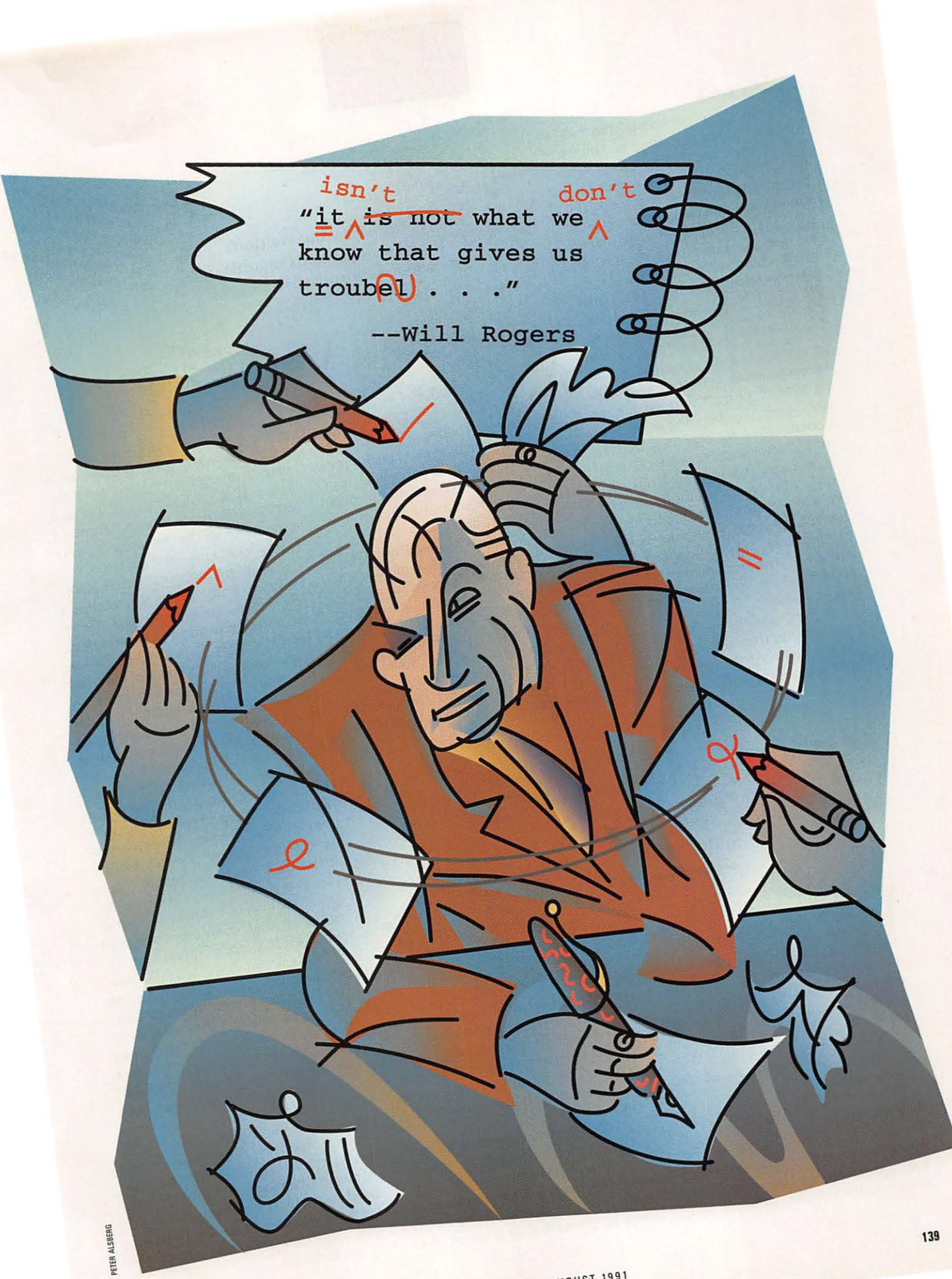
Can writing-analysis software help? To find out, I used Writing Tools Group's Correct Grammar for the Macintosh, Reference Software International's Grammatik Mac, Que Software's RightWriter for the Mac, and Sensible Software's Sensible Grammar on a variety of documents and evaluated their comments. These programs try to detect grammatical, punctuation, and style errors in everything from business letters to fiction, technical articles to advertising copy. Personalized editing on demand sounds good in theory, but can you really buy it in a box?

What should these programs look for in your writing? Customs and aesthetic standards for many kinds of writing change over time. And every good writer bends and adapts grammar and style rules to fit his or her personal voice. Still, writing experts, including these four software programs, agree on a few goals.

Good writing is clear, well organized, and vivid, yet uses words economically. Every word counts. The best writers avoid overstatements and clichés; they shun empty qualifiers, such as *very, pretty,* and *really.* (In their classic reference work, *The Elements of Style* [Macmillan Publishing; third edition, 1979], William Strunk, Jr., and E. B. White call such words "the leeches that infest the pond of prose, sucking the blood of words.")

Good writers reword awkward constructions and reject fancy words (*utilize*) where simple ones do the job better (*use*). When possible, they write in the active voice ("The teacher dismisses the students") rather than the passive ("The students are dismissed by the teacher"), and vary sentence structure to keep the reader from falling asleep. Most effective writers follow conventional rules of grammar and punctuation. Except in personal diaries, good writing reflects its audience as much as it does its author.

Rich subtlety, and exceptions to nearly every rule, help make English a beautifully flexible language. But for computer programs—inevitably based on identifying patterns and verifying data against fixed protocols—this beauty presents daunting challenges.



PETER ALSBERG

Points of Attack

Rising to those challenges, the programs reviewed here have two methods for detecting writing errors. First, using contextual clues, the programs *parse*—analyze the syntax, or structure, of each sentence, and assign a part of speech to each word. *Time,* for example, could be a noun, verb, or adjective.

Second, the programs compare each word or phrase against grammar, punctuation, and style rules—including lists of correct and erroneous uses—then flag offending items. This process, called *list checking,* catches wordy, pretentious, or weak phrases; clichés; and passive verb constructions. And these methods detect problems of subject-verb agreement, conflicting tenses, split infinitives, run-on sentences, double negatives, and a host of other common writing problems. They do so, however, in an erratic manner.

Parsing and list schemes vary greatly, affecting the quality and completeness of the analysis. The more sophisticated the parsers and the more diverse the lists, the more potential errors will be detected. These programs try to evaluate the context of each word or phrase, but they cannot understand writing. They can only suggest that the writer take a second look.

Grammatik: No response.

Correct Grammar: Avoid using words like *ain't* in formal writing. Consider revising to eliminate this nonstandard contraction. Consider using words that are more clear and concise.

"It isn't what we don't know that gives us trouble, it's what we know that ain't so."
–Will Rogers

RightWriter: *Ain't* is colloquial. Is sentence too negative?

Sensible Grammar: Replace informal phrase *ain't,* with "am not," "is not," "are not," "has not," or "have not."

Do They Work?

To their credit, the vendors of writing-analysis tools suggest that users look skeptically at the suggestions their products make. Still, all four companies promise a lot. Correct Grammar, for example, guarantees that it will catch 95 percent of your grammatical and spelling errors. Grammatik promises to make you "a better writer, faster."

To test such claims, I used each product on a business memo; excerpts from a grant proposal; a selection from a *Scientific American* physics text written for the general public; and a few pages from *The Red Pony,* a simple novel by Nobel Prize laureate John Steinbeck.

For the final test, I concocted a brainteaser—a document that was loaded with tough writing problems, including awkward constructions, run-on sentences, and dangling modifiers. In designing this test, I relied on Editorial Advisor, a tool for learning about writing (see "Electronic Writing Tutors").

I used the default settings for each program (only changing the preset style when a program offered more tailored settings such as academic or formal writing). Many of the problems these programs flag, such as complex, vague, or wordy constructions, are a matter of opinion. I used my judgment as a professional writer and editor with more than a decade of experience to decide when the programs' criticisms were on target.

While performance varied across programs and types of documents, a few general trends emerged. There are a few tasks that all four programs handle reliably. For example, they always detect long sentences, and the user defines the length at which each program suggests shortening a sentence. And each product evaluates readability by estimating the document's grade level and difficulty (see "RightWriter's Analysis"). This is useful for anyone who targets a particular audience. These programs can give you an idea of which words or sentences may be too complex for the intended readers. Readability scores across programs were consistent for most documents I checked—further evidence that computers are well suited for this type of analysis.

With almost any other task, however, expect erratic performance. All four programs frequently detect bona fide errors, only to follow up with ridiculous corrections. Or they may make a proper correction, then miss a similar error in the next sentence.

Within those limits, these programs can usually detect passive verb forms, weak constructions (such as "I think," "kind of," and "something like"), empty qualifiers, and the use of *which* when the writer should have used *that.* These are among the easiest writing problems to flag because they are typical and easily identified by list checking.

Grammatik: Avoid ending a sentence with a preposition.

Correct Grammar: No response.

"I long ago came to the conclusion that all life is six to five against."
–Damon Runyon

Sensible Grammar: Change vague phrase "long ago," to before or earlier. Change wordy phrase "came to the conclusion" to concluded or decided. Change overly formal phrase conclusion, to end.

RightWriter: No response.

Downhill from Here

In many more cases, unfortunately, the programs claim proficiency, yet miss as often as they hit. They misread complex punctuation, particularly when it involves quotation marks. All four programs suffer from subject-verb malaise. They flag problems in subject-verb agreement where no problems exist because they misidentify the subject or fail to distinguish between singular and plural forms.

Sensible Grammar flagged the noun *atom* as conflicting with the verb *work* in the following sentence: "How does the atom work?" And Sensible Grammar has considerable trouble evaluating those words that could be either noun or verb (such as *concerns*), or verb or adjective (such as *fast*).

My brainteaser test contained four subject-verb agreement errors. RightWriter detected none, Sensible Grammar one, Grammatik Mac found two, and Correct Grammar three. Among eight needlessly complex words in that test—including such gems as *interconnected, masticated,* and *fabricate*—Correct Grammar caught none, Sensible Grammar and Grammatik three each, and RightWriter five. As for six redundant constructions—such as "particular case," "basic essentials," and "equally as bad"—only Grammatik correctly flagged more than half the examples.

Sensible Grammar and Grammatik have the maddening habit of asking you to simplify a vast and apparently arbitrary collection of common words, such as *funds, disregard, concept,* and *determine*. Grammatik even rejects *however* as too formal, while Sensible Grammar suggests replacing "due to" with the purportedly simpler "owed to" or "resulting from." Jeez! (Whoops, flag *jeez* as slang.)

All four programs polluted my test documents with similarly silly flags involving commonly confused homophones—for example, questioning each instance of *there* and *their*. The profusion of flags for wordy phrases, misused pronouns, and a host of other routine writing foibles was an-

WRITING-ANALYSIS ROUNDUP

	Correct Grammar for the Macintosh 2.0	Grammatik Mac 2.0	RightWriter for the Mac	Sensible Grammar 1.6.2
Company	Writing Tools Group	Reference Software International	Que Software	Sensible Software
Price	$99	$99	$95	$99.95
Minimum requirements	1MB of RAM, hard drive	1MB of RAM, second disk drive	512K of RAM	1MB of RAM
Preserves formatting of checked document	●	●	●	●
Creates backup document	●	●	●	●
Format of printouts	corrected copy only	text with flags, suggestions	text with flags, suggestions	text with flags, suggestions [1]
Editable on-screen help	○	●	○	○
Readability analysis and general summary	●	●	●	●
Rules can be switched off/customized	●/○	●/●	●/○ [2]	●/○ [3]
Number of preset styles	10	6	5	1
Number of education-level settings	no range	no range	3 settings	no range
Interactive editing	●	●	○	●
Operates under MultiFinder	●	●	NA [4]	●
Legibility of suggestions on hard copy	NA	very hard to follow	moderately hard to follow	relatively clear; occasionally frustrating
SPELLING FEATURES				
Spelling checker	●	●	○	○
Size of dictionary	135,000 words	72,000 words	NA	NA
Can share WP dictionary	● [5]	○	NA	NA
Can create user dictionary	●	●	NA	NA
PROBLEMS PROGRAM ATTEMPTS TO CHECK [6]				
Double negatives	●	●	●	●
Long sentences	●	●	●	●
Split infinitives	●	●	●	●
Sentence fragments	●	●	●	○
Run-on sentences	●	○	●	○
Wordiness	●	●	●	●
Proper use of comparatives	●	●	●	●
Passive voice	●	●	●	●
Subject-verb agreement	●	●	●	●
Foreign words/phrases commonly misused in English	●	●	○	●
Overused phrases, clichés	●	●	●	●
Offensive (sexist, racist) language	○	●	●	●
Jargon	●	●	●	●
Colloquialisms, slang, informal usage	●	●	●	●
Vagueness	●	●	●	●
Redundancy	●	●	●	●
Pretentious, unnecessarily complex wording	●	●	●	●
Commonly confused words	●	●	●	●
Which versus *that*	●	●	●	●
Empty qualifier	●	●	●	●
Double words	●	●	●	●

● = yes; ○ = no. [1] Suggestions can be printed only as a separate document, in list form with relevant excerpts from text. [2] Users can add to word list but can't modify rules. [3] Users can add to word and phrase lists but can't modify rules. [4] RightWriter is a batch reader with no interactive mode, so MultiFinder operation is irrelevant. [5] With Microsoft Word only. [6] These are functional definitions; terms vary by program.

noying, since in many cases the writing was perfectly OK.

Hitting Bottom

Then there are the problems that none of the four programs detected. These included dangling modifiers: "At the age of five, my father taught me to ride horses." Nor could they see any hidden-modifier problem in this example: "Shining brightly outside the window, I saw the moon."

Among four awkward constructions, such as "an example of bad taste is a person who wears polka dots," Correct Grammar flagged one properly. Its competitors missed all four.

These programs can only occasionally detect typos that are not misspelled words, and rarely catch run-on sentences. Because grammar checkers treat text within quotes the same as text outside quotes, they cannot evaluate dialogue—which often violates rules of style and grammar by design—or documents that require faithful quotations.

Consider the overall performance of these programs (see "Evaluating Grammar-Checking Performance"). On their default settings—with most features turned on—the average correct-response rate was about 34 percent and the average incorrect-response rate was about 49 percent. Only RightWriter made fewer errors (33 percent) than correct responses (35 percent); 33 percent of its responses were equivocal. This means that you would spend at least half your time responding to annoying, time-wasting errant flags. But don't give up yet. Hope lies in customizing.

A Matter of Style

Three of the programs, RightWriter, Grammatik, and Correct Grammar, offer a variety of preset style guides. They adapt each program's rules to reflect writing style—whether fiction, business correspondence, academic, legal, or technical (see "Correct Grammar's Style"). Generally the preset styles merely turn off a few of the default rules. For example, RightWriter flags passive voice, computer jargon, and complex words in its business style, but not in its technical style.



As a rule of thumb, all four programs perform better on standard business writing than on fiction, academic, or technical documents. And used properly, style guides reduce the number of erroneous flags on other documents. But the improvement comes from reducing the number of items checked, not from better performance per se.

Still, I spoke with several users who work happily at the default settings. They apparently don't mind skipping incorrect flags. I presume that they don't accept bad advice; though reliance on these programs' expertise represents their greatest hazard, particularly for people who lack confidence in their own understanding of grammar and style.

Most people should turn off certain rules—an option all four programs offer. This gets rid of the most ridiculous and persistent flags, such as those related to word choice. RightWriter also features three education-level settings that primarily affect flags for uncommon or complex words.

You can tailor any of the programs to cover only things that they handle well and that you have trouble with. For example, you could check only for long sentences, passive voice, overly complex language, and vague phrases. Your document might improve markedly with little time wasted on writing-analysis overkill. Alan Weiss, a professional writer based in Rhode Island, gave up working with Correct Grammar in disgust after the program repeatedly "advised me to do absolutely bizarre things." He could have turned off a few rules to reduce the number of comments he got. Still, the more rules you turn off, the less value

EVALUATING GRAMMAR-CHECKING PERFORMANCE

Program Responses	Correct Grammar for the Mac	Grammatik Mac	RightWriter for the Mac	Sensible Grammar
MEMO				
Incorrect	51	51	32	52
Correct	49	38	43	31
Borderline	0	11	24	17
GRANT				
Incorrect	39	45	22	42
Correct	55	45	51	49
Borderline	5	10	26	9
TECHNICAL				
Incorrect	70	57	51	64
Correct	17	26	19	22
Borderline	13	16	30	14
STEINBECK				
Incorrect	68	61	25	61
Correct	30	17	25	21
Borderline	2	22	51	18
AVERAGE [1]				
Incorrect	57	54	33	55
Correct	38	32	35	31
Borderline	5	15	33	15
BRAINTEASER				
Correct	9	26	21	21

I tested the performance of each grammar-checking program on five documents. The first four documents represent a particular style of writing, and the last, the brainteaser, is loaded with tough writing problems. The results are recorded in percentages, rounded to the nearest whole number. Based on my writing experience, I judged the programs' responses as incorrect, correct, or borderline.

[1] Average does not include the results of the brainteaser test.

the programs offer. Deactivating rules to cut back on time-wasting comments makes little sense to Weiss. "If you have to turn off things like subject and verb agreement, why use it at all?" he says.

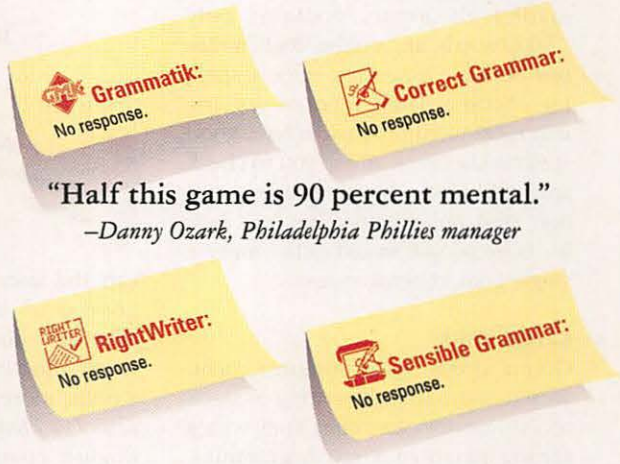
Yet with a little effort you can customize RightWriter, Grammatik, and Sensible Grammar to improve their checking skill. In RightWriter, users can add to word lists, and Sensible Grammar goes a step further by offering fully editable word and phrase lists (see "Sensible Grammar's Lists"). You can add colloquialisms, scientific terms, foreign words, and company names, or remove terms from the Sensible Grammar list.

Simple list editing is a distant cry from Grammatik's comprehensive adaptability, however (see "Grammatik's Rules"). You can edit style, grammar, word-choice, and parsing rules, as well as help screens; or create any of these from scratch. This takes some work, but a determined individual, or an organization that wants employees' writing to conform to the company style manual, could greatly improve Grammatik's performance.

Ease of Use

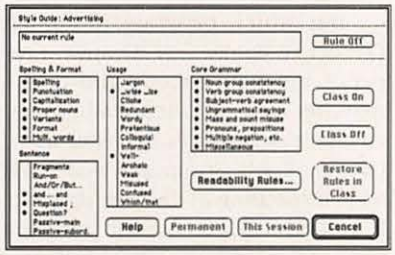
Enticed? Consider some other buying issues. All four programs list for about $100, all support the major word processors, and all read ASCII text files. For most of us, ease of use comes next on the shopping list.

All four programs share an annoying characteristic: they cannot be launched from within a word processor. But they diverge on other important features. The lack of an interactive mode for error checking hobbles RightWriter. It batch-reads the entire document and stores suggestions on a backup copy that you can either print out or review on screen. Que Software describes this as a superior approach that permits the user to review all errors and comments in context before considering specific changes. This is nonsense. Most users want the convenience of editing without having to wait for the software to finish checking. And besides, Sensible Grammar and Grammatik Mac each offer both interactive and batch modes.

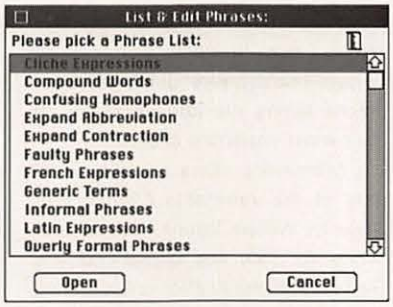


The printouts from all four programs present their own problems. Grammatik's could give you a headache if not ruin your vision—the program inserts bracketed comments in the text in a font identical to the text. RightWriter makes its comments in all caps, a slight improvement. Sensible Grammar does not reproduce the whole document, instead printing a list of sentences with alleged errors paired with the program's comments. While you have to work harder to keep track of the context, at least you can read the critique easily.

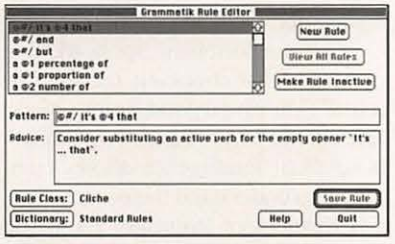
Correct Grammar places last in this category; it lacks batch-reading ability, and it offers no printouts. Correct Grammar's checks can proceed painfully slowly because you must view and respond to each flag one at a time. Yet Correct Grammar has the easiest interactive mode. Both Correct Grammar and Grammatik allow you to move forward and backward in the paragraph being checked, and to edit as you see fit—an important convenience the other programs lack.



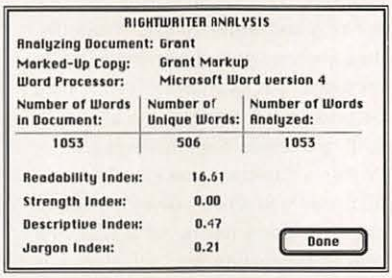
Correct Grammar's Style Correct Grammar provides ten style guides, each of which uses a unique configuration of the program's rules. The advertising style guide, shown here, allows clichés, colloquialisms, and other style and structure elements that would be flagged by the business or academic rules.



Sensible Grammar's Lists Sensible Grammar features fully editable word and phrase lists, including those shown on the above menu.

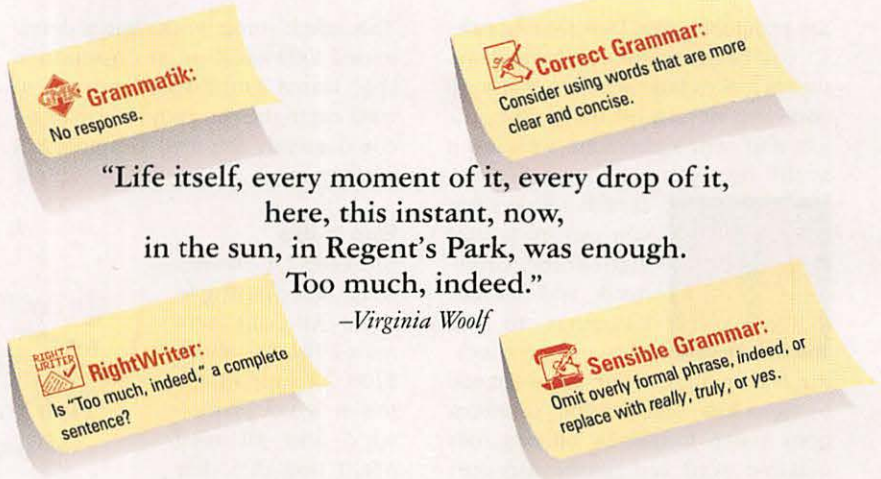


Grammatik's Rules Unlike its competitors, Grammatik Mac offers fully editable rules and allows users to construct their own rules.



RightWriter's Analysis RightWriter, like the other grammar and style checkers reviewed, provides a variety of analyses to help you judge the quality of your writing and whether it will be understood by your intended audience.

With its 135,000-word dictionary and the ability to share Microsoft Word's dictionary, Correct Grammar also offers the best spelling checker. Grammatik's dictionary contains only 72,000 words, and neither RightWriter nor Sensible Grammar offer a spelling checker. Their vendors, arguing that most word processors have good spelling checkers, advise you to check spelling before checking style, grammar, and punctuation. But let's face it—busy people would rather make a single comprehensive pass.



Caveat Writer

Given these shortcomings, who would want to use writing-analysis tools? Not novice writers. Only with a strong grasp of English grammar, syntax, vocabulary, and punctuation can the user discriminate between good and bad advice. Grammar checkers could turn a struggling writer into a lazy one. If you need help writing more clearly and succinctly, read *The Elements of Style,* or take an English composition course. Then reconsider a writing-analysis program.

Such a program could, however, help high school or college students in a classroom. Roland Nord, a professor of English at Mankato State University in Minnesota, uses RightWriter in his classes. He considers it a better teaching tool than a writing tool. The computer, he believes, can call attention to writing in a less judgmental way than a teacher's red pen.

And a good writer can make effective, if selective, use of one of these programs for those "how did I miss that?!" errors.

But which program? Rule out Correct Grammar first. Despite a superior interactive mode and dictionary, its lack of batch-reading and customizing features are fatal flaws. (Writing Tools Group says that it will add customizing in the next upgrade. If so, Correct Grammar will warrant a fresh look.) Cross off RightWriter next. Without interactive checking, it's hard to take advantage of RightWriter's relatively low error rate.

While Sensible Grammar has some attractive features, such as editable phrase lists, Grammatik is the clear winner. Its combination of style guides, editable rules and help screens, and solid interactive editing abilities make up for its modest dictionary and illegible printouts.

Can the formulaic application of rules and list-checking techniques actually improve a good writer's work? The answer is a cautious yes. But until artificial intelligence allows computers to understand the complexities and nuances of language, you'll still have to do your own thinking. ■

See *Where to Buy* for contact information.

ELECTRONIC WRITING TUTORS

It may be a long time before style and grammar checkers become reliable and efficient, but you can learn to improve your writing with other tools. Besides the proliferating ranks of spelling, dictionary, and thesaurus programs, several writing-education products have recently come on the market. They can assist in the creative process or serve as easy reference guides.

Two HyperCard reference tools—Nova Development's American English Writing Guide (which doubles as a desk accessory), at $59.95, and Petroglyph's Editorial Advisor, at $149.95—make it easy to bone up on style and grammar rules, and finally answer questions that have haunted you since the seventh grade. (When *are* split infinitives permitted?) These programs provide easy-to-navigate guides to all the writing problems most people will ever encounter.

Editorial Advisor (see *Reviews, Macworld,* May 1991), the more comprehensive of the two, also allows custom style guides. Organizations could use this feature to help employees learn house style; free-lance writers could create quick-reference stacks listing the idiosyncrasies of their most important clients.

Microlytics offers an online version of the venerable *Elements of Style,* by William Strunk, Jr., and E. B. White, for $59; and Digital Learning System sells the KeyNotes Associated Press Stylebook, based on the style guide that's the bible for many newspaper reporters, for $59.95.

But avoid Conduit's Writer's Helper, which lists for $125. This program tries to stimulate creative thinking and organize your thoughts, then analyzes your document to guide revisions. But its analysis features lag behind those offered by all other writing-analysis tools reviewed here. Writer's Helper makes checking documents harder by requiring you to convert documents to ASCII. Its checks for readability, "sweet versus stuffy" language, transitions, and word count either failed to function or were of dubious value.



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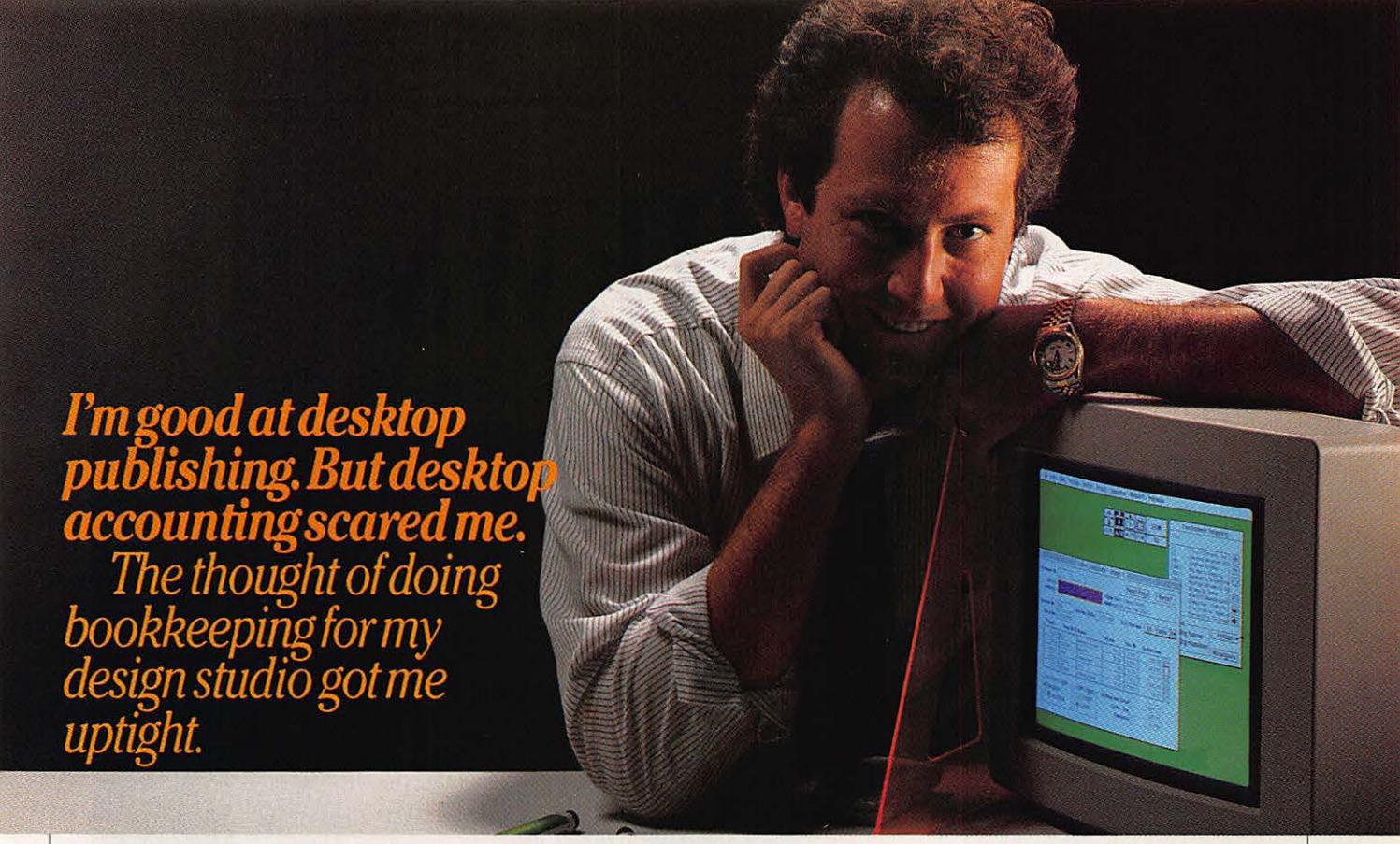
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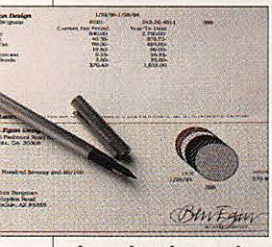
The thought of doing bookkeeping for my design studio got me uptight.

When I heard "balance sheet," I broke into a sweat. I know type, advertising, printing. Now I was forced to do our books.

No choice.

We were on our third part-time bookkeeper in eleven months, and she was called away suddenly. Sound familiar?

But I'm the boss and the buck stops with me. We had bills to pay, payroll checks to write, invoices to send, taxes to set aside.



And deadbeats to collect from–only I had no idea who owed us how much or for how long. Some suppliers may have even thought of *us* as deadbeats. I needed to know our cash flow, and get a handle on all this. But I didn't have a lot of time.

Step one: find an accounting program that feels as familiar as our Macs, that starts out easy, but has lots of reserve firepower for later on.

I found atOnce! The manual looked orderly. I dug in...

The familiar with the unfamiliar

atOnce! starts you off with a tutorial that uses HyperCard, one of my old favorites. I was at home.

Numbers are my nemesis, but the tutorial was actually fun and got me comfortable. It takes you step by step through the program, and gives you some easy-to-swallow accounting basics so you're not reading a foreign language. There's context-sensitive help, just in case.

And while you learn, you can start to set up your books. So it doesn't come in a flash and you sweat a little. But you do it and you learn.

I started off light. Double-clicked on one of the default charts of accounts and my General Ledger was practically set up for me. Then entered a few client names in Accounts Receivable, to get an idea of what was coming in. Prepared six invoices–and atOnce! calculated sales tax. Nice. Printed the invoices which I redesigned in atOnce!–realign a field here, change a font there. The usual.

Then ran a Customer Aging Report to identify the slow-payers (I had no idea such a terrific thing was even possible).

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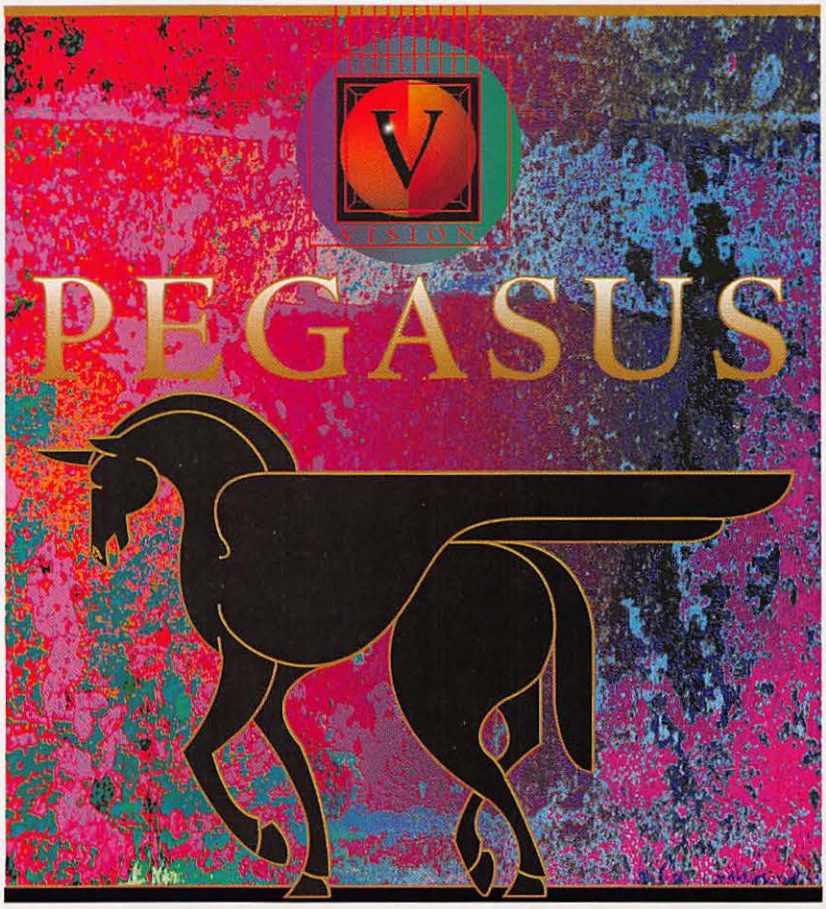
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REVIEWS

Draw Program

ALDUS FREEHAND 3.0

Pros: New palettes for filling, stroking, and layering; blends can be edited; supports and separates full-color TIFF graphics; type can be converted to paths; text can be on an ellipse; dynamic curve editing. **Cons:** Attribute style not applicable to text; type on a path tedious to kern; arrowheads not editable; curve points cannot be precisely converted; type capabilities lacking; interface sometimes bewildering. **Company:** Aldus Corporation. **Requires:** Mac Plus; hard drive. **List price:** $595.



MARK JASIN

On the Macintosh, most graphic artists fall into one of two camps—those who prefer Adobe Illustrator and those who prefer Aldus FreeHand. The new version of FreeHand, 3.0, rewards the faithful with an improved interface and several pumped-up features. A cursory examination reveals the program to be more powerful and more straightforward. But after a few days of close scrutiny, gaps appear—gaps in logic that make some operations inconvenient and others virtually impossible.

Floating Palettes

The first thing you notice is that most of FreeHand's new features are enhancements that make existing features more convenient. For example, in addition to the standard toolbox, FreeHand 3.0 offers three floating palettes that control the creation, application, and manipulation of colors, layers, and attribute styles. Although colors and layers have been available since version 1.0, palettes make them easier to access.

The Colors palette lets you alter the fill or stroke (outline) of a selected text block or graphic object simply by clicking on a color name in the palette's scrolling list. Any change made to a color accordingly changes all objects filled or stroked with that color. Otherwise, colors function as in previous versions of FreeHand; it's still irritating that you must create and name new colors before you can apply them to objects, which means going through several dialog boxes.

While colors have experienced a minor reorganization, layers have been downright revolutionized. You can create any number of foreground and background (nonprinting) layers, name them as desired, and arrange them in any order. The Layers palette has a list of user-definable layer names and a logical submenu of layer controls. You can send an object to a different layer by selecting it and clicking on a layer name. You can reorder a layer by dragging the layer name to a new position on the list. To determine whether a layer displays and prints, you simply click on the check mark that precedes the layer name. Finally, layers are as easy to use as they are in Canvas or MacDraw (programs that introduced layers *after* FreeHand did).

Attribute styles automate the process of filling and stroking artwork, making it possible to define a set of varied and complex attributes and to

apply them instantaneously by selecting an object and clicking on the style name. Attribute styles are useful for creating repetitive designs, such as schematic drawings and scientific diagrams. Ironically, attribute styles can be applied to objects only; you must fill and stroke type manually.

Splendid Blends

Ever since they were introduced in Illustrator 88, I have found blends (the creation of intermediary shapes or colors between a beginning and an ending shape or color) to be as much hassle as help. Though FreeHand's blends are still a far cry from perfect—you cannot make them accelerate, as in Arts & Letters on the PC, or flow along a curve, as in Corel Draw—their implementation has been significantly improved in version 3.0. For example, suppose you create a blend between two paths—one black, the other white—composed of several intermediary steps. If you select the blend and choose the Element Info command, the Blend dialog box reappears, allowing you to increase or decrease the number of steps. Also, if you alter the fill of the first or last path—say, change the black path to a red one—FreeHand recolors all steps according to the new requirements. But best of all, if you reshape the first or last path, FreeHand automatically reshapes all intermediary steps as well.

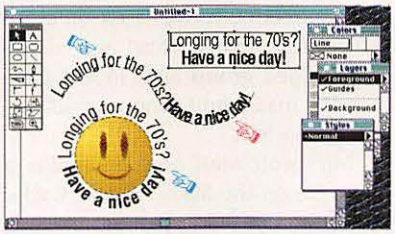
In addition to MacPaint, PICT, gray-scale TIFF, and EPS files, FreeHand now allows you to import and separate 24-bit color TIFF graphics to create printable artwork. You can't balance the colors as you can with gray-scale TIFF images, but you can alter the halftone screens to create dramatic special effects.

A Lack of Control

If all of FreeHand were as well engineered as its importing and blending features, I would have no reason to complain. Unfortunately, FreeHand's new-feature list shows signs of strain; for every pro, you can find a con—often a big con. For example, for making arrows, FreeHand now offers a choice of five automated arrowheads that can be assigned to the first and/or last endpoints of a selected line; however, the size of the arrowhead depends entirely on the line weight. Unlike MacDraw and Canvas—which provide extensive arrowhead editors—FreeHand doesn't provide any other means for controlling the appearance of an arrow. A hairline gets a minuscule arrowhead, while the arrowheads for thick lines are massive.

The path information dialog box has been enhanced to include not only the identity (curve, corner, or connector) and precise coordinates of a selected point, but also the coordinates of both bezier control handles associated with the selected point. Initially I judged this to be a strong addition, but a few hours later I discovered a bewildering flaw that destroyed the feature's potential.

Suppose you want to edit the angle of a curve point (a point that creates a smooth arc between two segments). If you edit the numerical location of either control handle, FreeHand automatically makes the point a corner point. There is no way to lock the second handle into alignment with the first. If you try to change the corner point back to a curve point—even if you have deliberately positioned both handles at symmetrical locations—FreeHand reverts the control handles to new locations that conform to the program's built-in definition of automatic curvature, thus annihilating your meticulous efforts. Unless you are interested strictly in adjusting the handles of corner points, these new options have been rendered useless. It's another good idea gone sour.



On Type of the World Type on a path spreads on convex curves and buckles on concave curves. However, when creating type on an ellipse, FreeHand 3.0 aligns the upper text along its descenders (the bottoms of *g*'s and *j*'s) and the lower text along its ascenders (the tops of *d*'s and *k*'s), ensuring symmetrical orientation. This has the added effect of evenly spreading all text. Note that a carriage return distinguishes type along the top of the ellipse from type along the bottom.

Type Immemorial

If you liked FreeHand because of its dominance in the typographic arena, you'll be disappointed to learn that the type in FreeHand 3.0 has changed in only two minor respects. First, there is a new command that converts type to editable paths. (This feature will be found by the end of the year in most drawing programs, Illustrator and Canvas among them.) FreeHand allows you to convert not only the popular Type 1 (Adobe) fonts, but also the Type 3 (Fontographer) variety.

FreeHand's second type enhancement, text on an ellipse, is more distinctive. At one time Aldus claimed that its most common user inquiry was about creating type along the top and bottom halves of a circle. FreeHand now incorporates this procedure, aligning upper and lower characters automatically (see "On Type of the World").

Compared with the page-layout capabilities recently advanced by Illustrator 3.0, FreeHand's type efforts seem puny. FreeHand still requires you to display the Text dialog box to create and edit type. If this sounds like little more than an inconvenience, consider this example: Unlike Illustrator, in which text along a path is automatically kerned, FreeHand buckles text along concave surfaces and spreads it along convexities. Normally, an Apply button lets you view type changes in the illustration window without closing the Text dialog box. But when you are editing type on a path, the Apply button is grayed; therefore, you must repeatedly open and close the Text dialog box to kern the type and then gauge the results. Since you must access the Text dialog box through another dialog box, the process becomes almost as tedious as, well, reading this paragraph.

An Interface Only a Mother Could Love

FreeHand's biggest problem has always been its clunky interface, which includes a Pandora's box of misplaced options, nested dialog boxes, and an awkward path info dialog box. At first

(continues)

glance, the improved interface is version 3.0's most remarkable improvement. Palettes facilitate common options; unnecessary hierarchical submenus have been eliminated; all fill and stroke attributes (except color) can be controlled from a central dialog box; bezier control-handle levers can be displayed; and a special set of QuicKeys macros is included with the program. Although the improved look-and-feel of FreeHand's interface has been only lightly touted, effort has obviously been expended on it.

A respectable improvement over past versions, FreeHand 3.0 remains at the crossroads between a very good program and a great program, half-useful and half-frustrating, half-powerful and half-meager. I mean, for crying out loud, FreeHand can open and edit PICT files created in MacDraw, and PostScript files created in Illustrator 1.1, but it still can't open its own EPS documents. Version 3.0 is on its way to becoming a first-class drawing program. But it's still a long journey at the rate of two steps forward and one step back.—**Deke McClelland**

See* Where to Buy *for contact information.

Electronic Mail

MICROSOFT MAIL 3.0

Pros: User-defined folders for storing messages; user-defined address book and group lists; remote dial-in access to server; messages can be routed through specific servers for maximum efficiency; automatic scheduled backups of mail files on server; includes HyperCard Software Development Kit for custom applications. **Cons:** Dial-In feature doesn't support enclosures; no Unsend option; administrator can't delete individual mail items. **Company:** Microsoft Corporation. **Requires:** Mac Plus; hard drive for server; AppleTalk network; System 6.0.2. **List price:** Mail Server $395; 5-Pack Mac Workstation $395; 20-Pack Mac Workstation $1349.

Microsoft listened to users' complaints and suggestions and added a strong series of features to its already robust server architecture to produce a winner, Microsoft Mail 3.0.

Listing all the new or improved features of Microsoft Mail (MS Mail) 3.0 would probably take all the space allocated to this review, so I'll just hit the high points.

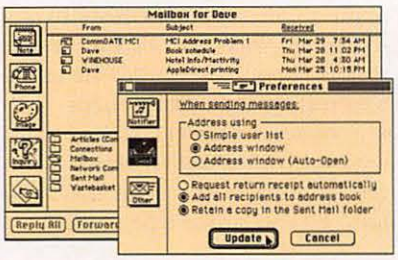
Users' Options

While Microsoft kept the user interface of the mail software the same as version 2.0's (why mess with a good thing?), the company has added an option for user-definable folders for storing messages (see "Using Mail"). In keeping with the Mac interface, to store a message you simply drag it to a particular folder. You can also store an extra copy in a different folder by holding down the option key and selecting a folder from the dialog box. Since these copies are really pointers to the original messages on the mail server, storing copies doesn't use more disk space, and you can view the copies from any machine when you log on to the mail server, even over a modem (with MS Mail's new Dial-In feature). There's also a Sent Mail folder, which you can configure to automatically store a copy of all your sent messages.

MS Mail has always been able to locate addresses on the network in a global directory. Version 3.0 lets you maintain a personal directory of most-used addresses from the larger directory, and special addresses, such as fax or MCI Mail addresses, that are not part of the global directory. Any address that you add to your personal address book from the global directory is also automatically updated when addresses are changed, say, when someone moves to a different server. The new MS Mail also allows user-defined group lists. In the past, only the mail administrator could define group lists.

Microsoft Mail now maintains a cache file on the Mac (MS Mail Cache in the System Folder). It stores such items as mail forms and also checks for changes made to them. The cache eliminates the need to transmit a form each time you use it.

MS Mail 3.0 allows you an unlimited number of enclosures. However, to prevent you from mailing the entire contents of a 40MB hard drive, the mail administrator can set a limit to the total size of the enclosures that can be sent with any message.



Using Mail The background window shows the message folders in the lower half of the window. The folder named Mailbox is open; its contents appear in the upper half of that window. The frontmost window shows some of the user preferences for Microsoft Mail 3.0.

And if you're on the road and need to access the mail server, version 3.0's Dial-In option allows either a Mac or a PC with a VT100 terminal emulator and a modem to send or receive mail. MS Mail 3.0 offers three levels of dial-in security: first, a user name and password; next, a Dial-In password; and finally, if desired, a call-back option (where the server calls you back at a preassigned number). Since the Dial-In option is designed for just one person, you can store only one number in the call-back option. One important feature is missing from the Dial-In option, though—you cannot send or receive file enclosures with messages.

Something for the Network Managers

On the administrative side, MS Mail no longer has the server periodically poll for pending messages—in version 3.0, when a message is ready on either the client or server side, it's sent immediately, which should reduce some unwanted network traffic.

In previous versions, the mail administrator had no control over old mail. In version 3.0, the administrator can delete mail older than a given date. The administrator has the option of sending a message that notifies the user when mail has been deleted. Although this option is a good start, I'd like to be able to selectively delete old mail, rather than deleting everything older than a certain date.

MS Mail 3.0's Network Administrator reports many more details about the server and its usage than does the previous version. User in-

(continues)

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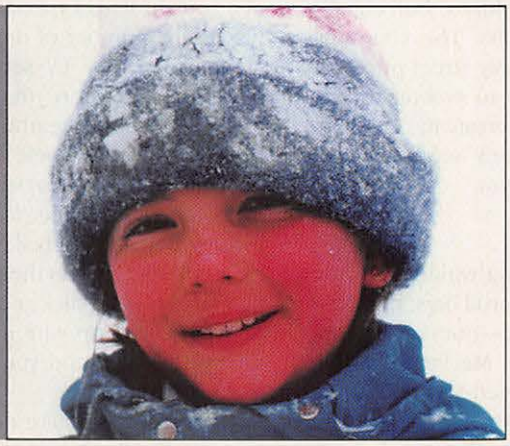
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Line Screen: 150 lpi
Gamma Correction: None

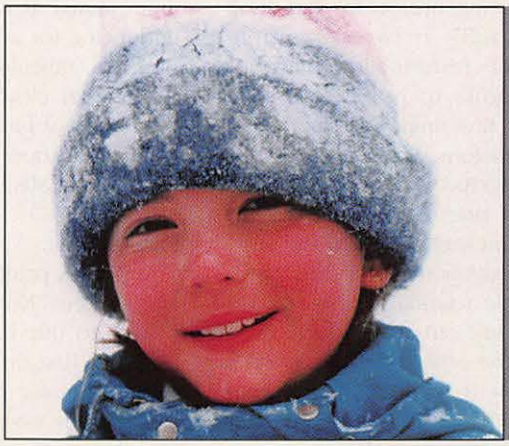




Silverscanner
Original: 8 x 10 B&W print
Brightness level: default
Input resolution: 150 dpi
Size: 419K
Output Resolution: 200 dpi
Line Screen: 150 lpi
Gamma Correction: None

Microtek Scan
Original: 8 x 10 color print
Brightness level: default
Input resolution: 150 dpi
Size: 1201K
Output Resolution: 200 dpi
Line Screen: 150 lpi
Color Correction: None





Silverscanner
Original: 8 x 10 color print
Brightness level: default
Input resolution: 150 dpi
Size: 1220K
Output Resolution: 200 dpi
Line Screen: 150 lpi
Color Correction: None

When it comes to selecting the right scanner, be forewarned. There is a difference you can see in black and white. And color. Just look at this comparison between the La Cie Silverscanner and the Microtek 300ZS. Both images were scanned at default settings with no corrections. This entire ad was then created and separated using Adobe Photoshop, Quark XPress 3.0 and a Linotronic 330.

As you can see, Silverscanner produced a better-looking image than the Microtek scan. Silverscanner lets you scan color, gray-scale, halftone and line art with dazzling clarity. La Cie gives you more with OCR compatability, faster color previews, versatile scanning controls and up to 1200 dpi.

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Circle 195 on reader service card

formation, such as free drive space or number of users, can be selected and stored for later use. Unfortunately, long reports look ungainly in a message or word processor file, since they are just a long line of headings and numbers; but they can be imported directly into a spreadsheet.

The response-time statistic, which tells you how well servers are communicating with each other, is particularly useful. This statistic can indicate that something's wrong with part of the network, for example.

Version 3.0 also adds an automatic backup feature for the mail server via a new cdev. With the cdev, you can set the time and frequency of mail-file backups to any drive that is attached to the server.

Crossing the Country

Microsoft has also added a configurable routing option for handling message traffic between multiple servers. This feature allows network administrators to reduce message traffic over slow links. For example, in previous versions, when two networks were connected via modem, all the servers on one network needed to exchange messages with all the servers on the other network. Now, with configurable routing, one server on each network can store all the messages for the other network; when a connection is made, only the two servers exchange messages, thereby reducing network traffic. The two designated servers then forward the mail to the appropriate users and servers on each network after the connection is broken.

Configurable routing could also be used where many office sites exchange mail. With version 3.0, you can choose a server at a central site, and have all the other sites send and receive mail via that site.

Keep Those Cards and Letters Coming

Microsoft Mail 3.0 offers a list of features comparable to CE Software's QuickMail 2.2.3, but with an interface that's easier to use. These features, coupled with better directory services and a good server architecture, make MS Mail 3.0 a better buy than QuickMail 2.2.3.—**Dave Kosiur**

See* Where to Buy *for contact information.

Color Paint Program for Kids

KID PIX 1.0

Pros: Brilliant; hilarious; innovative; inexpensive. **Cons:** None. **Company:** Brøderbund Software. **Requires:** Mac Plus; System 6.0; 2MB of RAM for color Macs; System 6.0.7 for recording sounds. **List price:** $49.95.



When Apple chairman and CEO John Sculley unveiled the new Macintosh line at the Macworld Expo in January, to show off the new computers he demonstrated a remarkable program that won gasps of delight and a roaring ovation. Was it Microsoft Excel 3.0? WordPerfect 2.0? System 7.0?

No. The program was Kid Pix, a perfectly executed color paint program aimed at children, but equally entrancing for adults. This charming program, ridiculously street-priced at $29, comes closer to embracing the Mac ideals of fun, creativity, and simplicity than does any software since the original MacPaint.

Picture This

The Kid Pix painting window fills the Mac's screen. No scroll bars, no zoom boxes, no title bar—nothing to confuse the first-time Macintosh artist. There's a color palette (if you're using a color system), and even the pencil draws in any color you click on. There are only three menus, and every command is illustrated. The program even offers a Small Kids mode, where the menus are hidden and a checkerboard bib protects the periphery of the screen from wayward clicks while in MultiFinder.



Felix's Forest This work, by 9-year-old Manhattan artist Felix, addresses the theme of man's quest to conquer his environment. Note the subtle evocation of the primeval forest through the deft use of the tree tool. The artist observes that the illustrated menus serve as a central metaphor for the computer as art medium.

Brøderbund claims Kid Pix gives you "the best-looking art you've ever heard," and they're right: every single tool in Kid Pix makes fun sounds when you paint. The pencil makes a scritch-scratching sound while you drag it; the eraser produces little scrubbing noises; the letters of the alphabet are spoken, or exclaimed, or sung, as you click on each one; and every tool icon gives a little pop when it's clicked. And oh, such tools! There's a drippy paintbrush that makes gloopy sounds as it goes; a pine-needle tool that leaves a spiky trail of crinkly-sounding needles; a fun zigzag brush that's impossible to drag in a straight line; a rubber stamp that places any number of dinosaurs, ice-cream cones, or TV sets into your painting; and more than 50 other tools. The most breathtaking is the trees tool; with a single click, it produces a stunning, realistic, different-every-time fractal tree (to the accompaniment of a Tinkerbell ripple). Most habit-forming of all is the now-famous firecracker—one click and your entire drawing blows up with a thoroughly satisfying *boom!* and you're ready to start all over again.

There are a thousand hidden surprises in Kid Pix. When you click on a tool on the vertical palette, the icon palette at the bottom of the screen displays options for that tool—line widths for the wacky pencil; special effects for the electric mixer, the firecracker, and other zap-the-painting erasers. There's always a question mark on this horizontal palette; click on it to get a different surprise for every tool. For example, it fills the oval tool's ovals with rainbow stripes. And it makes the eraser reveal a gorgeous hidden picture—a halftone butterfly, squid, or giant magnet—underneath your own painting as you scrub away. And in the unlikely event that that's still not enough serendipity for you, with most of the tools, pressing the option key produces something else unexpected and funny.

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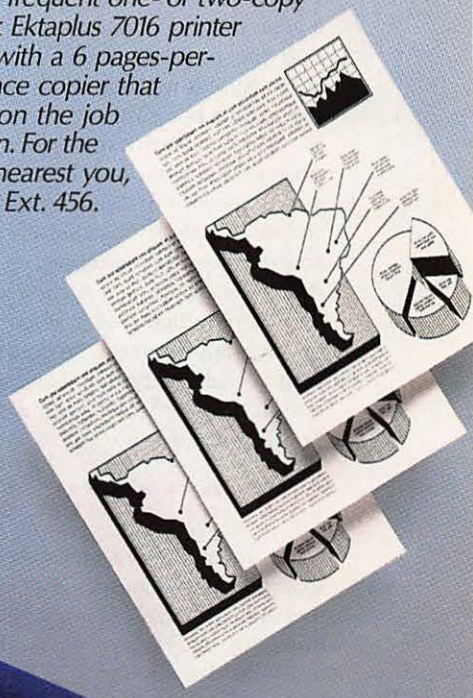
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The Pencil Point

All of this is pure, simple exhilaration. The sounds are hilarious; the effects spectacular; the surprises perfect. You could spend days or weeks and never tire of Kid Pix's humor or surprise.

My panel of child experts—TV-jaded, techno-savvy New York City



kids—were captivated. Althea, who's 6, spent a few determined moments trying to figure out the mouse. But for the following hour and a half, she was immersed in making drawing after drawing—and then nuking each with the firecracker. Only her mom, arriving to pick her up, succeeded in dragging her away; by that point she had mastered clicking on the pencil, specifying a line thickness, picking a color, and drawing with the mouse. I invited Marcolina (12) and her brother Felix (9) to try Kid Pix together; after a great evening of painting, Marcolina said the only thing she didn't like about Kid Pix was that it was too hard waiting for her turn.

Watching my experts open surprise doors, paint fractal-tree forests, and experiment with colors and shapes, I realized that Kid Pix is also an extremely successful piece of educational software. It's got the sounds and flashing lights of a video game, but they appear in the process of creating something beautiful and lasting. It's got "Sesame Street"'s zaniness and gentle repetition, but it's inter-



active and therefore much more engaging. And with an arsenal of creative messing-up tools—spattering paint, invading Pac-Men, a broken-glass tool—Kid Pix has the splashy fun of fingerpainting without the risk to upholstery. Exploration is continually rewarded, and the learning is completely self-paced.

And by the way, Kid Pix could even teach software designers a thing or two. Kid Pix lets you set the pencil's thickness all the way up to 2 inches—a giant Magic Marker. Why don't any professional paint programs offer such wide swaths? One Kid Pix icon is the "undo guy" (or as Althea came to call him, "Mr. Oh-no," because he either says "Oh no" or makes the sound of a rewinding tape when you click on him). Wouldn't an on-screen, one-click undo tool be smart in any graphics program?

Then there's the joyous randomness of some Kid Pix tools—the drippy paint, the fractal trees, the zigzag brush. After five minutes with Kid Pix, you'll realize that this element of chance is artistically liberating and highly conducive to new ideas. Suddenly the professional paint programs, which only do what you explicitly tell them to do, seem confiningly unimaginative by comparison.

Nuts . . . Nits!

The color-selection squares should really be larger; my panelists sometimes had trouble placing the arrow-cursor tip on just the right color



swatch. (That was in 16-color mode, which makes the squares bigger; in 256-color mode, they're positively microscopic.) And as a mostly-grownup, I miss having free font and size selection for text—yes, there are times when I'd want to use Kid Pix for real work.

But everything else about the program is perfection: great manual; fantastic sounds; clever options—with a Macintosh IIsi or LC, or with MacRecorder and System 6.0.7, you can record a sound right into a painting so that it plays whenever you open the painting. You can also edit the rubber stamps, and even tell the program what text you want the text spray can to spray out.

The programmer, Craig Hickman, originally wrote Kid Pix for his son, who loved MacPaint but kept launching desk accessories and bringing up dialog boxes by mistake. For a while it was a shareware offering, and it's finally been picked up and polished to a shine by Brøderbund. Dear Mr. Hickman: You have created a masterpiece. Thank you for your imagination, whimsy, and attention to detail. Now write us a word processor.

—David Pogue

See **Where to Buy** *for contact information.*

Multimedia Program

MEDIAMAKER 1.0

Pros: Straightforward interface; remotely controls wide range of video input and output devices; mixes video routines, graphics, and sound for self-running sequences; outputs sequences to videotape; some transitional animation effects included. **Cons:** Only single video-in, audio-in, and video-out capabilities; no built-in sound control; no image processing or video-on-video effects; 99-minute play and record limit per videotape. **Company:** MacroMind. **Requires:** Mac Classic; hard drive; 2MB of RAM; video input board; video output converter; compatible video device. Recommended: Mac II; 4MB of RAM; laser disc player; Apple-compatible CD ROM drive. **List price:** $695.



MediaMaker is the first Mac software to offer near-professional video-editing capabilities at a price tag comparable to that of a desktop publishing program. When you're finished, you can "print" the whole production to videotape.

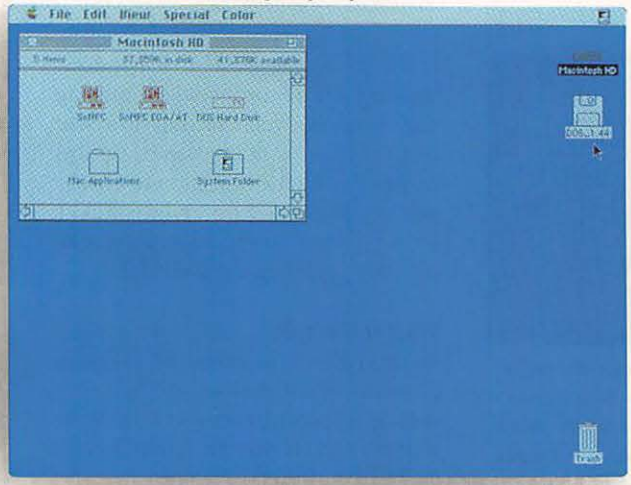
And You Think Cable Is Expensive

MediaMaker actually controls the actions of various pieces of hardware, including the playback and recording of images and sound. Your primary expense is not just the software, but rather the purchase or rental of video recorders, laser disc players, audio CD players, and so on. You need a video source device with a remote port so it can be controlled directly from the computer. Most such devices are 8mm videotape recorders and camcorders, priced between $350 and $1000, or professional laser disc players priced at $2500 or more. (At press time, MediaMaker supported only three VHS devices, all made by Sony.) You also need a video input board—$2000 and up—to view your sequences on screen, or at the very least a standard NTSC monitor (television), so you can see what you're doing.

If you want to use MediaMaker just to scroll through presentational images on screen—like a HyperCard front end—you can stop there. But if

(continues)

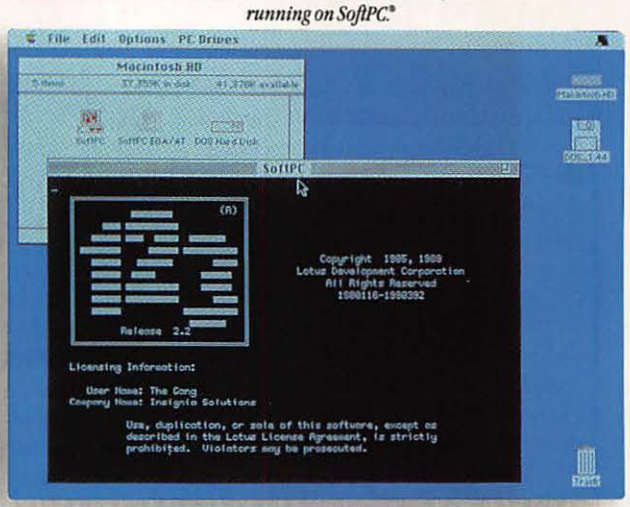
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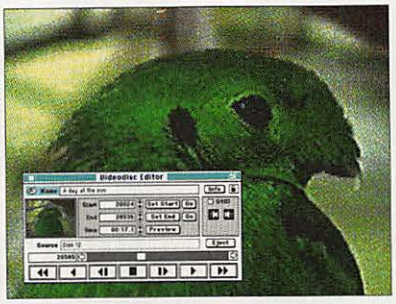
you want to edit and record sequences to videotape, you'll need a second video recorder or camcorder. (Because MediaMaker doesn't digitize or store video images, you can't use the same recorder to play and later record a sequence.) To display images on screen via a video input board, you'll also need an encoder to convert the RGB signal (produced by the computer) to a composite signal that can be interpreted by a standard video device. A low-end encoder can run as little as $600 to $1000.

The program also drives the Apple CD-SC or a compatible CD ROM player via the SCSI port. (MediaMaker plays only audio tracks from a CD.) This brings the cost for a MediaMaker-based desktop video-production system to somewhere between $2000 (*very* low-end) and $10,000 (fully functioning), not including the computer.

Collecting Media

To assemble a presentation or video production, MediaMaker lets you combine three kinds of elements: Mac graphics files, which can be color bitmaps saved in PICT format, or animation routines stored in PICS or MacroMind Director format; video routines, originating from videotape, laser disc, or live events captured with a video camera; and sound, whether digitized Mac sounds or recorded voice and music from a compact disc. MediaMaker requires that you assign these elements to *picons* (pictorial icons). Each picon represents a section of a graphic, video, or audio routine.

The control panel provided with each picon enables you to load a graphics or sound file, or operate the video or audio hardware remotely via a serial or SCSI port connection. For example, suppose you've recorded a presidential press conference. You might create one picon that represents the president's 10-second introduction, another that fast-forwards to and then plays a 35-second response to a question, and a third that sums it all up with a thrilling 3-second sound bite. None of these events is digitized to disk; they're merely marked and named in MediaMaker. Each picon keeps track of where an event starts and ends (see "Start and Stop"). If the picon plays a PICT file, still frame, or other stationary graphic, you can specify how long the image remains on screen.



Start and Stop When open, picons offer specialized editing panels. The Videodisc Editor provides options for specifying the first and last frames in a routine. Transport controls (at bottom) let you play, pause, cue, and review the current laser disc.

You assemble Picons and save them to disk in units called collections. Whether you treat them as temporary holding stations or presentation fields, you can use collections to organize picons and experiment with the routines they represent.

When you "play" a picon, Mac graphics files and video routines are displayed on screen, in the foreground or background. Mac sound files play from the computer's speaker. CD tracks and other audio accompaniments can be transmitted to a stereo receiver, analog mixing board, or directly to a video recorder; they are not processed by the computer.

Putting It All Together

If you need to create a self-running demonstration or a postproduction videotape, you can organize picons into a three-tiered sequence window. The first tier holds graphics files; the next, video routines; and the last, sounds. The length of the scrolling sequence window represents time. Elements in the same tier cannot overlap. In other words, you can't play two CD tracks at the same time. You can, however, overlap elements in different tiers.

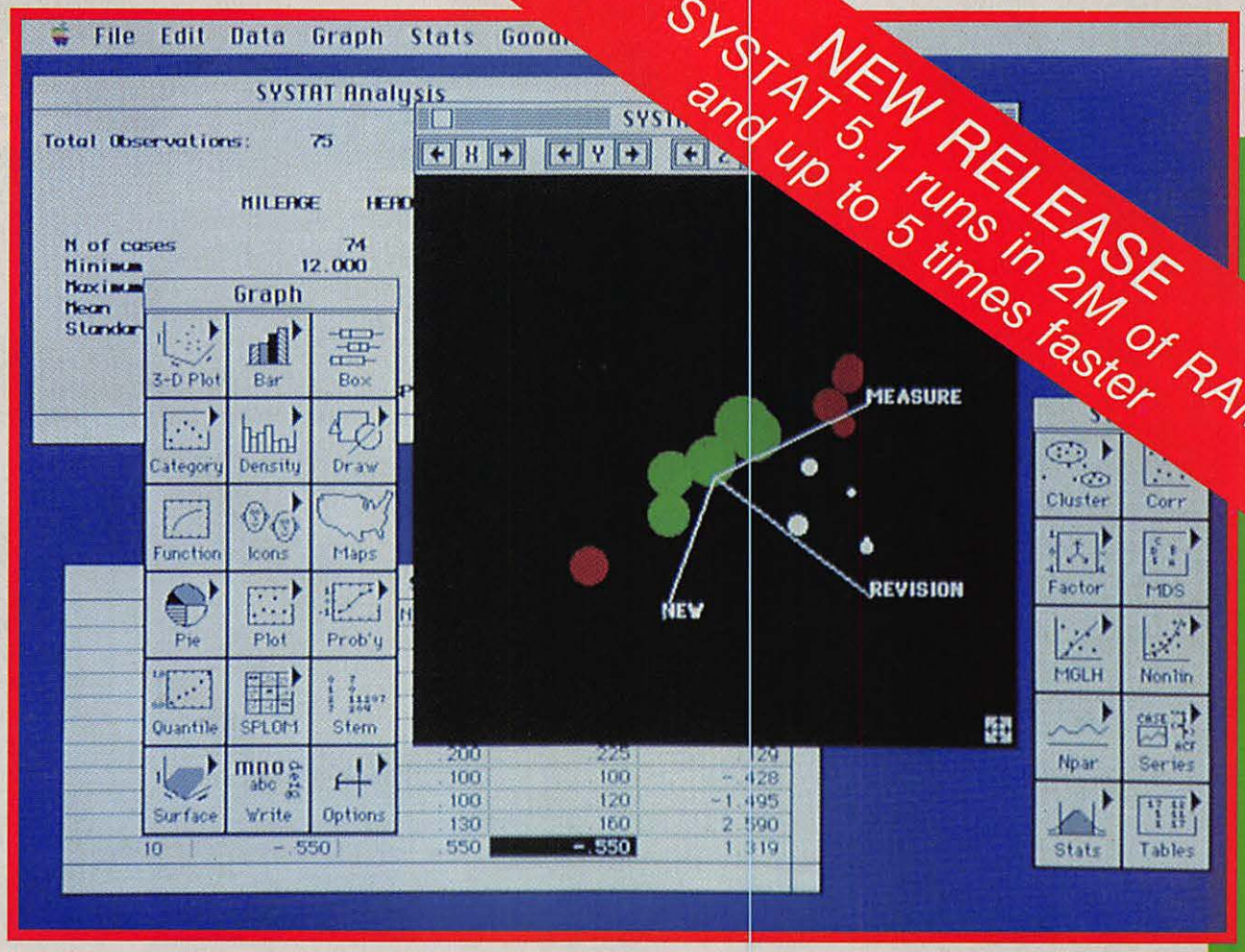
When creating a final videotape, MediaMaker returns to the desktop publishing metaphor. A videotape recorder is attached to the Mac printer port. The composite video signal travels through a standard RCA cable. Choose the Print to Video command, and MediaMaker plays and records the contents of the sequence window, pausing the recorder when making transitions between picons. If a Mac or CD sound is being played, it also pauses during the transition to ensure perfect syncopation. MediaMaker even prompts you to swap source laser discs, videotapes, and CDs.

What It Can't Do

MediaMaker is a model first-version program. What it does, it does very well. But, predictably, there's a lot it doesn't do. If you're familiar with NewTek's Video Toaster for the Amiga, you'll quickly recognize that MediaMaker falls short in several areas. Largely because of hardware limitations, MediaMaker only allows one video input and one video output. While MediaMaker includes an assortment of animated transitional effects, video images cannot be superimposed on each other, and there are no video-mixing capabilities. Also, MediaMaker lacks special image processing and transformation effects—not only the ugly ones like weird color distortions, but also useful ones like frame rotation and zoom. MediaMaker will not accommodate videotapes longer than 99 minutes, presumably because the accuracy dwindles off considerably after that point. This means that you can't access the last 20 minutes of source material on a 120-minute tape or create a 100-minute or longer sequence. And finally, MediaMaker is not sound-processing software. *All* audio work must be performed manually, using a relatively old-fashioned analog mixer.

Perhaps surprisingly, I don't consider any of this to be inherently detrimental. First and foremost, MediaMaker is organization and automation software. It enables you to create elementary image sequences, and like an all-in-one remote-control unit, it controls the actions of several input and output devices. In this light, the fact that it lacks high-end effects is trivial. Like the first version of PageMaker, this is a monumental and highly effective piece of software at the grass-roots level. It is, to my mind, the first irrefutable indication that multimedia has a future on the Macintosh.—**Deke McClelland**

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Circle 33 on reader service card

Page-Layout Program

PERSONAL PRESS 1.0

Pros: Proxies give feedback in dialog boxes; Posted Notes; good manuals and online help; powerful alignment and layer controls. **Cons:** Edits text at 100 percent view only; no automatic kerning; only full-point lines; can have only one publication open at a time; style sheets don't include paragraph attributes; mediocre templates. **Company:** Silicon Beach Software. **Requires:** Mac Plus. **List price:** $299.

When Aldus Corporation, the creator of PageMaker, bought Silicon Beach Software last year, it acquired Personal Press, a page-layout program designed for beginning and occasional pagemakers. The program draws on many of the strengths of Silicon Beach's other programs (particularly SuperPaint and Digital Darkroom), and even adds a little of Aldus's prowess in the form of import filters.

One notable innovation is the use of Proxies (see "By Proxy"). Almost every dialog box lets you preview changes to the text or graphic, so you can try things out before you click on OK. Another innovation is the ability to place Posted Notes—containing the date, time, and any comments you want to pass on to your colleagues on any page. You can hide, show, and print the Posted Notes.

Page Space

Personal Press lacks the now-ubiquitous pasteboard for storing items off the page, but does provide a Workbook—a Scrapbooklike window where you can store page elements.

There are tools for creating boxes (containers for text and graphics), lines, and ovals; and for placing the time, date, or page number anywhere on the page (but not within a line of text). You can specify any element's size and position numerically or with the mouse; make it visible or not, locked or not, and printable or not; and as with most programs, you can apply lines and fills to any elements.

There's a wide variety of line and fill patterns (the same as SuperPaint's), though you can't specify a simple percentage tint. The greatest problem, however, is that you can't specify a line thickness smaller than 1 point.

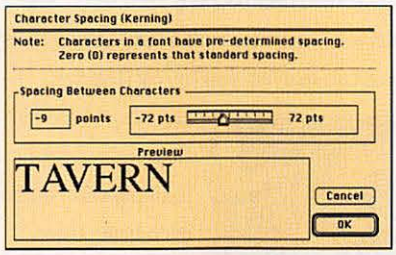
In addition to the normal Send to Back and Bring to Front commands, page elements can be shuffled back and forth a layer at a time. You can also nudge the elements in 1-point increments and align them to each other or to the page margins. An Equals tool makes two objects the same size and shape—click on one object, then the other, and voilà.

Like PageMaker, Personal Press allows only one publication open at a time, so it is difficult to move items between publications. You can, however, import formatted stories from PageMaker publications, but not from other Personal Press publications.

You can either import text into boxes or type directly on the page. There is a well-designed spelling checker and thesaurus to polish your writing (though there's a good argument that a word processor is a better place for this). You can edit text at only one magnification, however; when you choose the text tool, Personal Press automatically takes you to 100 percent view, and all the text boxes come to the front, obscuring graphic objects that were in front of them. That's just plain annoying.

The type-formatting controls are rudimentary, which is perhaps to be expected in a low-end page-layout program. You can specify type size, leading, word spacing, and kerning in 1-point increments, but there's no automatic kerning.

Personal Press's style sheets are also rudimentary; they offer character formatting, but no paragraph formatting such as indents and tabs.



By Proxy Most of Personal Press's dialog boxes let you see a representation of what your text or graphic will look like after you've made changes.

Imported Graphics

You can import PICT, EPS, TIFF, and MacPaint, as well as SuperPaint and Digital Darkroom PICT, and Digital Darkroom archives. You can scale graphics to a given size (though not by a percentage) or have them fill a graphics box proportionally or nonproportionally.

Personal Press offers almost-impressive image control for gray-scale bitmaps. There are brightness and contrast sliders, plus a pencil tool for drawing your own gray-map curve. Unfortunately, it's hard to draw a decent curve with this tool; a set of canned curves would be more useful.

Automatic Creation

The AutoCreate feature lets novices quickly build documents using the provided templates. A separate manual describes the templates so you can choose which boxes your text and graphics fill. Personal Press then builds the publication, pulling the files into the template.

The templates have one key flaw: they don't include style sheets. So once you've flowed the text, you're on your own for speccing the type. The templates aren't very attractive, and most users will need to adjust them to make them work.

The manuals and online help are excellent, with both step-by-step guidance and big-picture understanding. Personal Press's features are generally well implemented, but the program sports an odd mix of power-user features (notably Replicate and Image Control) and limitations (1-point minimum line weight, no automatic kerning). The design and feature list should be fined-tuned to suit newcomers to page makeup.

There's also a serious printing problem—fills often hang outside of boundaries. And the program tends to crash unless you keep your system stripped down.

In choosing between Personal Press, which makes it easy to create bad pages, and its less expensive competitor, Publish-It Easy, which makes it possible (and not difficult) to create good pages, I would definitely opt for Publish-It Easy.

—Steve Roth

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Circle 364 on reader service card

14-Inch Color Monitor

NANAO FLEXSCAN 9060S

Pros: Can be used as a PC-compatible PGA, HGC, MCGA, CGA, EGA, VGA, super-VGA, or 8514A display; automatically recognizes sync signals; controls are conveniently located; complies with Swedish ergonomics recommendations. **Cons:** Minor.
Company: Nanao USA Corporation.
Requires: Mac II. **List price:** $939.

The innocent and experienced alike will be delighted with Nanao's Flexscan 9060S monitor. It passed my acid test with flying colors. From the cables supplied with the monitor, I selected the one for the Macintosh II Video Card and plugged it in. (The other cord is for IBM-compatible TTL displays.) I hooked up the power cord, and bingo—there was my desktop, in living color. And what pretty, saturated colors they were. I didn't use any scientific instruments to measure color purity, temperature, other esoteric visual criteria; but I can tell you that I felt no eyestrain even after hours in front of the screen, whether using color or black-and-white applications. The screen image was uniformly bright and sharp.

The comfortable viewing is probably attributable to the screen's .28mm dot pitch and 90Hz vertical refresh rate, numbers that promise sharp images with no annoying flicker; then again, it might be attributable to the "improved dynamic and static raster regulation technology" and the "dynamic focus circuitry," which the manual says "makes characters and graphics even sharper." I don't know what they mean either, but I slept better knowing the monitor on my Mac had them.

Ergonomically Correct

Too many monitors have controls in the back, on the theory that if you don't like the way they were set at the factory, you should be forced to bow obsequiously in front of the monitor when you change them. Nanao thoughtfully places the seven most-used controls on the front of the monitor, unobtrusively tucked below the faceplate. They're even labeled with little Macoid icons. They adjust the vertical position of the image, horizontal position, vertical size, horizontal size, text mode, contrast, and brightness. The text-mode knob sets the screen to normal color when it's in the center position. The manual says turning the knob to the right makes the screen go black and white; but on my Mac it turned the screen a curious range of pastels. Turning the knob to the left converts the screen to a truly hideous amber color (this setting was obviously meant to be used for DOS text-mode programs).

There are two more knobs at the rear of the unit. Twisting the one labeled Convergence had no effect on the picture. A company spokesperson explained that this is because you can't see this fine adjustment to the image without a special optical instrument. It's factory-set anyway, so it's unlikely you'll have to use it. The other knob adjusts *pincushioning.* Pincushioning is the tendency for monitors to bend horizontal and vertical lines into a concave (pincushion) or convex (barrel) shape. The Flexscan I received was devoid of distortion of any kind, but it's good to be able to make the adjustment if you have to. Two more controls affect the display only when used as a DOS monitor.

Low Radiation

The Flexscan complies with two standard Swedish ergonomics recommendations. The first standard refers to the Swedish Agency for Administrative Development's recommendation for very-low-frequency (VLF) magnetic induction and magnetic-field radiation, an area of growing concern among us tube-in-a-cube workers (see *Macworld,* July 1990). For this review Macworld Lab tested the Nanao Flexscan 9060S color monitor for extremely-low-frequency (ELF) and VLF emissions and observed approximately 60 to 75 percent less ELF magnetic emissions from the Flexscan than from the AppleColor High-Resolution RGB Monitor in the front of the monitor. Approximately the same reductions were observed in the VLF magnetic range. Electric-field emissions, however, were about four times greater for the Flexscan in the ELF range, and just less than two times greater in the VLF magnetic range in the front of the monitor.

ELF*

	4"	12"	28"	36"
Front	6.65	1.49	0.28	0.19
Back	8.90	1.95	0.23	0.17
Left	14.44	3.10	0.49	0.27
Right	10.78	2.66	0.45	0.25
Top	13.23	2.31	0.31	0.17
Bottom	**	1.55	0.35	**

** Magnetic emissions measured in milligauss.*

*** Unable to take measurement.*

Using the Holaday HI-3600-02 ELF/Power Frequency EMF Survey Meter, we measured emissions at 4, 12, 28 (arm's length), and 36 inches from the center of the front, back, left, right, top, and bottom of the monitor.



JOHN WILLIAM LUND

Nanao Flexscan 9060S

The second standard addresses that maddening dust coating that screens collect. Static electricity buildup creates the dust-magnet effect. The Flexscan has a coating, which the company says eliminates the problem. In a few weeks of daily use, the screen did seem to stay cleaner than comparable screens I've worked with.

If you work in an office that also includes DOS machines, the Flexscan's ability to double as an auto-sync IBM-compatible monitor makes it especially attractive. You probably wouldn't want to share a single monitor between two systems, but if one monitor goes down you'd be able to swap monitors as needed. Even if you're in a strictly Mac shop, the Nanao Flexscan 9060S is an excellent choice if you're looking to add color to your system.—**Tom Wrona**

See **Where to Buy** *for contact information.*

Music Education CD ROM

CD COMPANION SERIES: IGOR STRAVINSKY: THE RITE OF SPRING

Pros: Irresistible music; easy installation; included screen fonts prevent display problems; easy-to-follow linear organization; excellent music commentary. **Cons:** Expensive; occasionally slips into music jargon; could include more examples from other recordings. **Company:** The Voyager Company. **Requires:** Mac Plus; System 6.0.5; HyperCard 2.0; hard drive; CD ROM drive. **List price:** $99.95.

Musically speaking, the entry fee for music appreciation CD ROM software has until recently been rather high. *The Magic Flute* (on Warner New Media's three-disc set) is an opera, of course, and there are many who turn a deaf ear to all operas, no matter what their merits. Nor is Beethoven's String Quartet no. 14 (also on Warner New Media) likely to send the Madonna set into orbit—not on first hearing, anyway. And Beethoven's Ninth Symphony (on the pioneering Voyager title), though universally admired, still sounds pretty, well, classical.

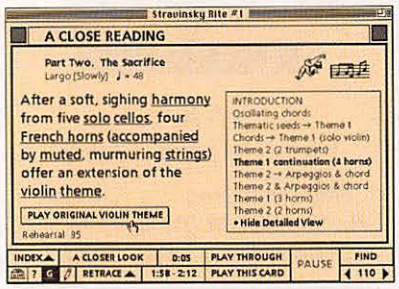
But Voyager's new entry in the genre, Igor Stravinsky: The Rite of Spring, changes all that. Seventy-eight years after its premiere, *The Rite of Spring* still sounds anything but "classical." For members of the *Fantasia* generation, parts of it are as familiar as the "Mickey Mouse Club" theme song. But even if *The Rite of Spring* doesn't conjure up images of soaring pterodactyls and belching volcanoes, it's difficult to imagine anyone not responding to the animal energy of one of our century's most significant musical works.

Like Warner New Media's and Voyager's previous titles, The Rite of Spring is a combination HyperCard stack and audio CD/CD ROM disc. Installation is simple (the brief manual is primarily devoted to this task), and the suite of decompressed stacks occupies about 2.8MB of hard drive space. In addition, the program comes with a suitcase of screen fonts, which eliminates display problems. The recording on the disc is that of the Orchestre Symphonique de Montreal conducted by Charles Dutoit. Though many critics have a soft spot for the composer's own 1960 recording, this one is well regarded and has the advantage of spectacular digital sound.

As it was in his previous Voyager title, Ludwig van Beethoven Symphony No. 9, the structure of UCLA professor Robert Winter's program is more linear and less overtly hypertext-like than Warner New Media's titles, which are richly layered with sidebars, tutorials, minilectures, and a variety of other useful and enjoyable side trips. Mind you, these sorts of materials are not lacking in The Rite of Spring; they're just more tightly integrated into the overall design. And as a result, I for one find the program easier to use, easier to navigate, and (perhaps because it has a clear beginning, direction, and conclusion) more compelling.

The Rite of Spring is divided into seven parts. The Pocket Guide displays the overall structure of the work on a single card and plays each of the piece's 14 sections at the click of the mouse button. Stravinsky's Orchestra describes the composer's unusual instrument choices for *The Rite of Spring* with text, pictures, and specially recorded sound bites for each instrument. Stravinsky's World includes a brief biography of Stravinsky, descriptions of his previous major works (*The Firebird* and *Petrouchka*), and background on the time and place (avant-garde Paris) and the genesis of the piece.

The Rite Listening section covers the use of rhythm, harmony, musical themes, and orchestration in *The Rite of Spring*, and describes in detail the "shape" of the work, theme by theme and section by section. The Rite as Dance section elaborates upon the visual and dramatic part of the work; although it's usually a concert piece nowadays, *The Rite* was conceived and initially produced as a ballet. In addition to a description of what is known about the original production, this section includes an initially awkward but finally compelling (and largely verbal) attempt to reconstruct Nijinsky's original choreography. Throughout all these sections, ubiquitous buttons play either relevant measures from *The Rite* itself or selections on a variety of solo instruments, and a cornucopia of graphics illustrate the music, the ballet, and the people and places of the time. A glossary—reached via a glossary button or by clicking on any of the specially marked terms in the text—explains the musical terms used, and an enjoyable game tests what you've learned in previous sections.

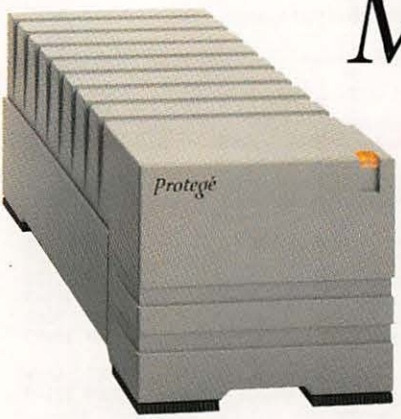


Window on The Rite In The Rite of Spring's real-time commentary section, dance and music icons at upper right lead to related discussions in other parts of the program. A button in the lower left corner of this card plays a related phrase from earlier in the work, while clicking on A Closer Look in the control panel at the bottom opens a more detailed discussion. A click on an underlined word opens the corresponding glossary entry; underlining can be turned off to make text easier to read.

In contrast to Warner New Media's titles, which offer three or four different play-through commentaries, the Close Reading section is the only part of The Rite of Spring that plays the piece nonstop from beginning to end, with accompanying annotation. The right side of each card can display either a general or a detailed view of the piece's structure, however, and if you're willing to pause every few measures, almost every card (there's a new one about every 10 seconds) has a button that leads to more detailed information and discussion (see "Window on The Rite"). While at first I missed having a choice of no-hands, running commentaries that I could sit back and absorb, I soon came to appreciate the need to pause and think and replay musical fragments, and came to understand why author Winter chose to enforce a kind of partici-

(continues)

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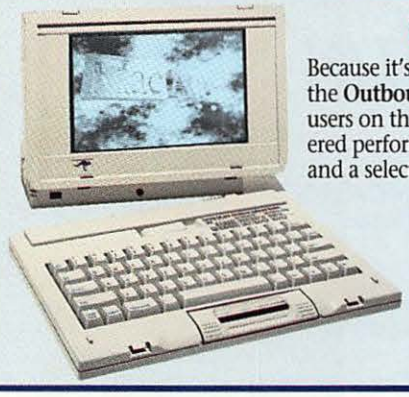
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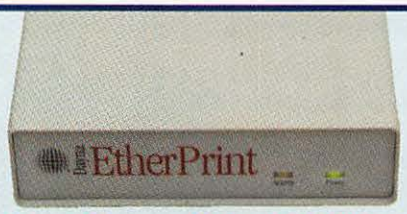


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Protegé Color Scanner.....*22768* $1739
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TelePort (modem only) *22311* $145

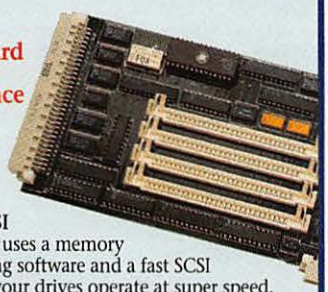
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DataLink Express.....*22306* $179
DataLink LC.....*22320* $257
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DaynaPORT E/LC.....*22548* $299
DaynaPORT E/LC-T.....*22549* $299
DaynaPORT E/IIsi.....*22550* $299
DaynaPORT E/IIsi-T.....*22551* $299
EtherPrint *22541* $355
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PhoneNET Connector Din-8.....*22513* $31
PhoneNET StarController *22516* $924
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Protegé 2400 External w/ SW.....*22315* $119
Protegé 2400/SendFax 9600 w/ SW *22316* $139
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Protegé V.42bis External w/ SW *22317* $219
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RasterOps 24S *23557* $495
RasterOps 24STV *23568* $1549
RasterOps 264/SE30 .....*23539* $685
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A³ Mouse.....*25288* $89
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DT3600 Digitizing Tablet *23734* $295

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UPS 370ci.....*26294* $337

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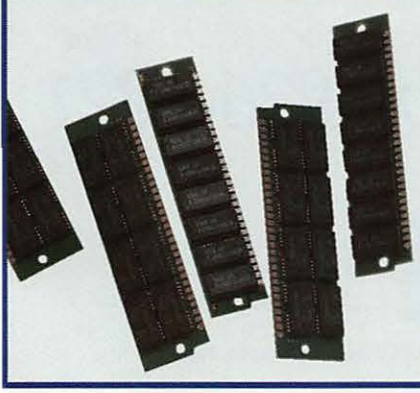
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QuadraLink (Applied Engineering)... *26917* $205

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VoiceLink.....*23738* $199
Bernouilli
Tape Cart: Bernouilli B33C 44MB.....*57804* $95
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SE Anti-Glare Filter (platinum) *26883* $32
Mac Cable
MacSpeaker.....*26923* $179
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SE/Classic Carrying Case.....*26901* $79

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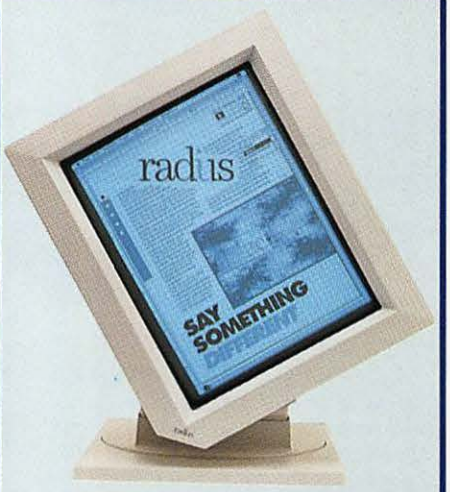
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Taste.....*30638* $86
Microsoft
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Correct Grammar v2.0 .....*30633* $49

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4th Dimension v2.1 .....*27780* $489
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Claris FileMaker Pro *27789* $216
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Wingz v1.1 .....*30184* $253
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Quicken v1.5 .....*28458* $39
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WealthBuilder v1.0 .....*28496* $145
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Accountant Inc. Pro. v2.0 .....*28480* $345
Software Toolworks
Dollars & Sense v5.0 .....*28465* $86

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SimCity v1.2 .....*28678* $29
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Carmen Sandiego - World *28672* $29
Carmen Sandiego - Time *28774* $29
Davidson & Assoc.
Math Blaster Mystery *27970* $29
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Earl Weaver Baseball *28768* $32
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Software Toolworks
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Life & Death *28658* $32
Spectrum Holobyte
Faces *28766* $24
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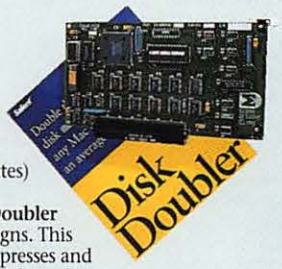
14" Seiko w/RasterOps 8S *22024* $989
14" Seiko w/RasterOps 24S *22023* $1049
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ScanMan 32
(Logitech) *22751* $319

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patory, as opposed to passive, style of listening.

I also like Winter's writing style and sense of humor (as when he relates the now legendary story of Walt Disney, who thought that Leopold Stokowski had recommended "the sock" for *Fantasia* when the conductor used the French title of the piece, *Le Sacre du Printemps*). I like the fact that Winter doesn't shy away from using musical notation (which is almost always tied, bouncing-ball fashion, to audio examples) to explain himself.

I don't like Voyager's pricing strategy; I won't be happy until music titles come in under $50. I worry that someone with no memory of grade-school music class might find the lack of a few basic music lessons, such as those found in Warner New Media titles, a major impediment. I wish Voyager would include more musical recordings of other works, again like those found in Warner New Media offerings, instead of depending so heavily on solo turns by Winter and his colleagues. And despite his style and sense of humor, Winter does occasionally lapse into music jargon too highfalutin for the average listener. These are, however, minor problems overall.

It's hard to imagine how outrageously wild and raucous *The Rite of Spring* must have seemed to the audience on the night of its premiere. It's amazing, in an age when heavy metal refers to music, not machinery, how outrageously wild and raucous it still sounds. For anyone with an interest in what makes music tick, Igor Stravinsky: The Rite of Spring can help you understand what sent the opening-night audience into paroxysms of boos and catcalls, explain how *The Rite of Spring* "works" as a piece of music, and show why *The Rite of Spring* sounds as fresh and exciting today as it did in 1913. If you've been waiting for an excuse to buy a CD ROM player, wait no longer. And above all, if you like *The Rite of Spring* (and who doesn't), you'll love Igor Stravinsky: The Rite of Spring. It will show you that there's a whole lot more to like than you ever thought possible.—**Robert C. Eckhardt**

See **Where to Buy** *for contact information.*

400-dpi Color Flatbed Scanner

PHOVOS 400C

Pros: Fast; produces bright, saturated colors; competitively priced. **Cons:** Poor shadow detail; no transparency option. **Company:** Prime Option. **Requires:** Mac II; 8-bit color board; color monitor; System 6.02. Recommended: 2MB of RAM. **List price:** $5995.

Have you ever been asked your opinion of a colleague applying for a job, and cringed because the prospective employee is a wonderful person, a pleasure to be around, but basically messed up? That's close to how I feel about Prime Option's Phovos 400C scanner.

I've grown quite fond of the 400C over the last few weeks. It has earned a place in my heart mainly because it's the fastest color scanner in the Mac market—some 50 to 100 percent faster than comparable flatbed units. For some people this speed advantage doesn't count for much, but if you scan frequently and work with large files, a fast scanner can start to feel like a trusty friend.

The 400C has other endearing qualities: it's priced around $2000 to $2200 less than the other 400-dots-per-inch Mac flatbed scanners; it's bundled with a good selection of software; and the scans come up on screen looking bright and crisp. I even enjoy the way the 400C drones out a little five-note melody as it scans.

Still, as much as I like the 400C, I can't recommend it. At this price, a scanner should deliver quality that stands up to such demanding applications as color separation for print publishing, and the 400C just isn't up to the job.

What It Is

The Phovos 400C is Prime Option's repackaging of a machine that's actually made—but not marketed to consumers—by Ricoh. At this writing Prime Option has not announced an attachment for transparencies, so for now the machine scans only reflective art. Its maximum optical resolution is 400 dpi, and its active scan area measures 8½ by 11 inches.

Like the Mitsubishi SC7500 (see *Reviews*, July 1991), the Prime Option machine is what I call a true one-pass scanner. This design is the source of its speed and sets it apart from other flatbed scanners.

All Mac color flatbed scanners build a 24-bit color file containing millions of colors by adding together 8-bit (256-color) red, green, and blue files. All flatbed scanners except the Mitsubishi and the Prime Option use only one light-sensing unit—known as a charge-coupled device, or CCD—to capture the three primary-color components of the scan. Some of these scanners make separate passes for red, green, and blue, while others, commonly referred to as one-pass scanners, take three sequential readings at every point as they move across the scan bed.

The Phovos 400C, then, is a true one-pass scanner because it uses three CCDs instead of one. A prism splits the white light reflecting off the artwork into red, green, and blue beams, which pass to the respective sensors. The result is that the 400C can take in a full 24 bits of information simultaneously at each scan line. This translates to a scan time of, for example, about 50 seconds for a 5-by-7-inch print at 200 dpi, compared to 1½ to 2 minutes for most flatbeds (some units are even slower).

Another advantage of three-CCD scanning is that it lets the Prime Option and Mitsubishi machines achieve an excellent degree of registration of the three colored layers that make up the scan. Misregistration of the red, green, and blue scan files is common in Mac scanners and can blur details.

The Soft Story

One of the strange things about Mac scanners is that typically the more money you pay, the less software comes bundled with the machine. The Phovos 400C breaks that rule: it ships with Adobe Photoshop LE as well as Pre-press Technologies' SpectreScan and SpectreSeps. Photoshop LE, the limited edition, has the same features as Photoshop, except that the color-separation tools have been

(continues)

stripped out (you can upgrade to the full-strength version for $250).

SpectreScan is an advanced scanning and color-correction program that offers many color-correction features not available in Photoshop. The Prime Option SpectreScan driver wasn't available when I wrote this review, so I wasn't able to test the software. However, SpectreScan lets users who aren't experts on color theory to easily do such things as eliminate color casts and adjust tonal values. SpectreScan makes corrections as it scans, or it can be used to correct previously scanned TIFF files.

The Phovos Photoshop module, a plug-in software module supplied by Prime Option, enables users to access the 400C from within Photoshop. The module is a bit deficient, lacking such features as a 1-bit black-and-white mode; a readout that shows how much disk space is available for scans; and resizing controls. It offers only five resolution settings, none of which correspond to screen resolution, and the lowest (120 dpi) of which is too high a resolution for many purposes. Still, the Photoshop module works.

Pre-Press Technologies' SpectreSeps is useful only if you print separations directly from the Mac. Special versions are available, at no charge, for separating pages directly from QuarkXPress and PageMaker.

The Hitch

Scans made with the Phovos 400C look great on screen. They come up in bright, saturated colors that are relatively true to the original, without the noticeable blue or red bias common to many Mac scanners. The images also tend to exhibit a full range of values, from pure white to pure black. So far so good.

Unfortunately, the 400C delivers very little detail in either shadows or highlights. In some images this deficiency can be exaggerated to the point where the dark parts of the picture look almost posterized—areas that should show a smooth transition from dark to light jump from a light band to a medium band to black. Highlights jump straight to white without any of the shadings that give a picture dimension. Tests I made with a gray step chart confirmed that the Phovos was markedly worse than other Mac scanners—even those costing less than half its price—at differentiating among dark grays.

The problem is that the Phovos applies tonal corrections to all scans automatically, whether you want them or not. You can see evidence of this if you look at a Phovos scan by using the histogram in Photoshop or another image processing program. The histogram shows gaps, a telltale sign that the scanner is delivering to the Mac fewer than the full 256 values per color channel.

Al Robbins, a Ricoh spokesperson, confirmed that Ricoh makes the scanner with different ROMs that have different characteristics. The ROM that comes in the Prime Option machine has gamma correction programmed into it. (Gamma correction is a common method for brightening scans; typically it enables you to lighten midtones without overbrightening highlights or washing out blacks). In general, when you alter a scan to improve one thing, you usually lose something else. In the case of the 400C, the high-quality saturation and contrast seem to be at the expense of detail. Or, as Robbins noted, the 400C's ROM chip is "optimized for screen display." On-screen presentations and low-resolution color printouts made with Phovos scans look vivid and sharp. However, it also appears that the Phovos 400C's gamma correction tends to favor certain colors over others. With some prints, however, the negative effects I've mentioned will be minimized and the scanner will give good results.

But no one pays $6000 just to display scans on screen or print photographs composed of only certain colors. While it's true that no Mac scanner equals a high-end color-scanning and film-printing system when it comes to holding shadow and highlighting detail, the Phovos falls short of even the Mac standard.

The chief advantage of a 400-dpi scanner, as opposed to a typical (and much cheaper) 300-dpi scanner, is that the extra data enables you to print at higher resolutions, and to enlarge images without losing sharpness. If you've determined that you need a 400-dpi machine, you'll be much better off looking into the Agfa Focus Color II, which lists for $7995 without software, or the $8195 Howtek Scanmaster 3, which includes Photoshop and a GPIB interface board. Both machines are a bit overpriced, but at least they're able to do the job.—**Joe Matazzoni**

See **Where to Buy** *for contact information.*

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Bright but Not Beautiful Mandatory color corrections applied by the Phovos 400C tend to maximize color saturation at the expense of detail. Notice the loss of shadow and highlight detail on the Phovos scan (left) compared to the original (right).

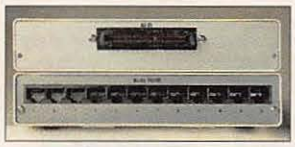


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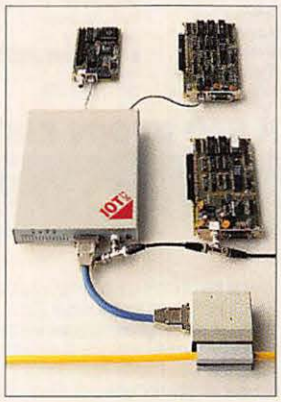
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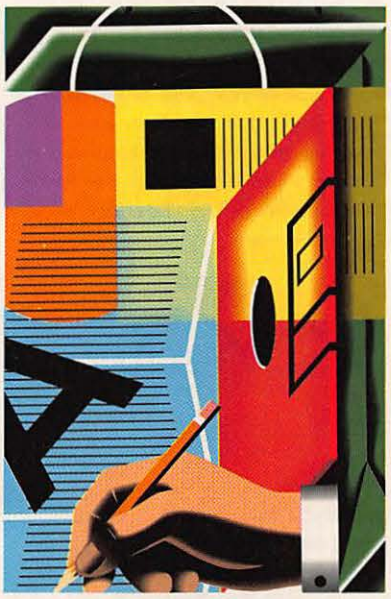
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WINDOW SHOPPING

by Lawrence Stevens

This month I look at a disk catalog program; a program to make jigsaw puzzles; training programs; a Finder alternative; a nutrition program; a password-recovery program; and southwestern clip art



RON CHAN

ColorDex 1.2

Disk catalogers create a database of the files on floppy disks. You can search for any file, and the program tells you which floppy disk contains that file. Over the past year, I have reviewed three such programs: MasterFinder (Tactic Software), Offline (SNA), and Cataloger (Masters Publishing). While extremely helpful, these programs do not solve the problem of misfiled floppy disks.

ColorDex ($49.50 from ColorDex Company) attempts to solve the problem of locating floppies with a color-coded labeling system. The package comes with color-coding labels for 20 disks. You create a ColorDex database by inserting floppy disks into the Mac one at a time. ColorDex captures the file names from each floppy disk and tells you which color code to assign to the disk. (The screen displays each color's initial, so ColorDex can also be used with a monochrome monitor.) Then, to help you locate a file, ColorDex displays the floppy disk's name and color.

The ColorDex system has a few disadvantages. First, the labels are too small: you can't write the disk's name or the names of the files on the labels. And each disk is identified only by its color-coded label, so you're completely dependent on the ColorDex database to locate a floppy disk, which can be a problem if your computer goes down. And a pack of 20 labels costs $7.50.

Still, if you have a large floppy-disk library and have problems keeping it organized, ColorDex can save time searching for missing disks. If you're willing to color-code your floppy-disk library, this program can make finding a file a breeze.

PuzzleMaker 1.0

PuzzleMaker ($49.95 from Imateq Systems) enables you to create and solve jigsaw-type puzzles on the Mac.

The program provides easy ways to create puzzles out of PICT images created in such programs as MacPaint. For example, PuzzleMaker can automatically disassemble a picture that is made up of internal boundaries, such as a map of the United States with state borders, into a puzzle with one piece for each section. You can also create a template of your own boundaries, and PuzzleMaker can use it to create a puzzle. After you create a puzzle, you can flip or rotate any of its pieces to increase the difficulty of solving it.

To solve a puzzle, you move each piece into place using the mouse (see "Solving Puzzles"). You can have the program help by indicating the pieces that border any given piece, correctly positioning a piece, or even solving the entire puzzle.

PuzzleMaker, however, needs more RAM than the 1MB rquirement stated in the manual. In order to create a puzzle out of a PICT image of a U.S. map, I had to allocate 3.5MB of RAM (using the Get Info box) to PuzzleMaker. Once the map puzzle was created, I had to allocate 1.2MB to solve the puzzle.

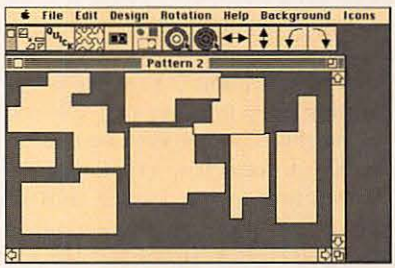
If you have at least 2MB of RAM (4MB would be preferable), PuzzleMaker can give you the ability to create instructive and amusing puzzles.

Baobab Individual Learning Courses

Each of these $79 tutorials (for Claris MacDraw II, Claris FileMaker Pro, Claris MacWrite II, and Claris MacProject II) from Baobab includes a disk, a slim manual, and an audiocassette and takes about six to eight hours to complete.

The tutorials don't follow the traditional approach of going through a program's menu items one by one. Instead they present real-world projects, such as editing a thesis in MacWrite, creating a database of titles and

(continues)



Solving Puzzles To solve a PuzzleMaker puzzle you use the pointer to position the pieces. The arrows at top let you rotate or flip pieces, bring pieces to the front, or send them to the rear. The program beeps each time a piece is correctly positioned.

scanned images in FileMaker Pro, and drawing an organization chart in MacDraw II. You use the menus and tools to complete projects rather than as isolated functions.

Alternatively, Personal Training Systems (PTS) tutorials (from Personal Training Systems), provide detailed instructions on each menu command and walk you through each function. Because of this step-by-step approach, PTS takes five modules ($79.95 each) to go over about the same amount of material as Baobab's single module. PTS covers the material in greater detail and offers more hand-holding. If you need to be told, keystroke by keystroke, how to use a program, PTS is your best buy; but if you want to explore the software's features in a creative and free-form manner, go for the Baobab tutorials.

Initial Caps 1.0

Initial Caps ($99 from Berkana International) provides a variety of EPS images to use as initial capital letters in documents. The set includes 5 complete alphabets plus an additional 78 Variety Caps, most of which are eye-catching. There are also 108 background tiles for the caps, to add decorative variety.

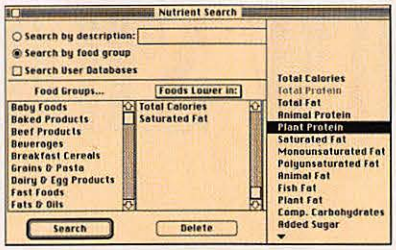
The clear and concise 81-page manual contains excellent instructions on how to use initial capitals in PageMaker 4.0, FreeHand 2.02, and Adobe Illustrator 3.0.

Mr. File 1.0

Mr. File (a $99 desk accessory from Softways) is an alternative to the Finder and Apple's Find File DA. Mr. File works in the background and performs most Finder functions, including opening applications or documents; renaming floppy disks, files, or folders; erasing floppy disks; duplicating files; creating new folders; and moving files. You can also use the program to launch applications without quitting to the Finder, and to open documents in applications other than their creator application. Mr. File also allows you to use search parameters to locate a file.

MacDINE II 1.0

MacDINE II ($299 from DINE Systems) calculates the body weight that is optimal for you, determines the ideal daily caloric intake for achieving that weight, and monitors intake of calories and nutrients as well as expenditure of calories based on your daily activities.



Nutrient Search MacDINE II lets you search for foods that are low and/or high in particular nutrients. First you select the type of food, such as Baby Foods or Fast Foods, from the leftmost box. Then using a large, scrollable pop-up menu, you select the components you want the food lower in (Total Calories and Saturated Fat have been selected here). Next you select the components you want a list of food highest in (here, Plant Protein). The program then displays a list of foods that meet your selected criteria.



Finding the Password After recovering a password from an Excel, WordPerfect, or Wingz file, MasterKey displays the password, file size, and other information about the file.

There are a number of programs, many a lot less expensive than MacDINE II, that help you monitor calories. For example, Calorie and Nutrition Counter, and Weight Loss Clinic, are two Excel templates from Heizer Software ($25 for both programs). Calorie and Nutrition Counter, however, lists only about 700 foods, while MacDINE II has a database of 5600 foods and 194 activities.

MacDINE's database provides nutritional data on specific foods. When you type *potatoes* or *ravioli,* for example, the program lists food under the category from which you can make a selection, such as Wendy's potatoes, broccoli, and cheese; or Ravioli, beef in-sauce Chef Boy-ar-dee. Once you make your selection, the program includes the food's name and its nutritional and caloric values in your daily record. You can also use the database to search for foods that meet certain nutritional requirements (see "Nutrient Search").

Because of its price, MacDINE II will probably be purchased primarily by professional nutritionists.

MasterKey 1.10

MasterKey ($165 from New Visions) comes in versions that recover passwords to protected files in Microsoft Excel 2.2, WordPerfect 1.X, and Wingz. MasterKey has three levels of search: Quick, Regular, and In Depth (In Depth takes longer but is more likely to be successful). MasterKey either displays the recovered password along with other information or indicates that it could not find the password (see "Finding the Password"). If MasterKey does not recover the password, you can try again using a more extensive level of search.

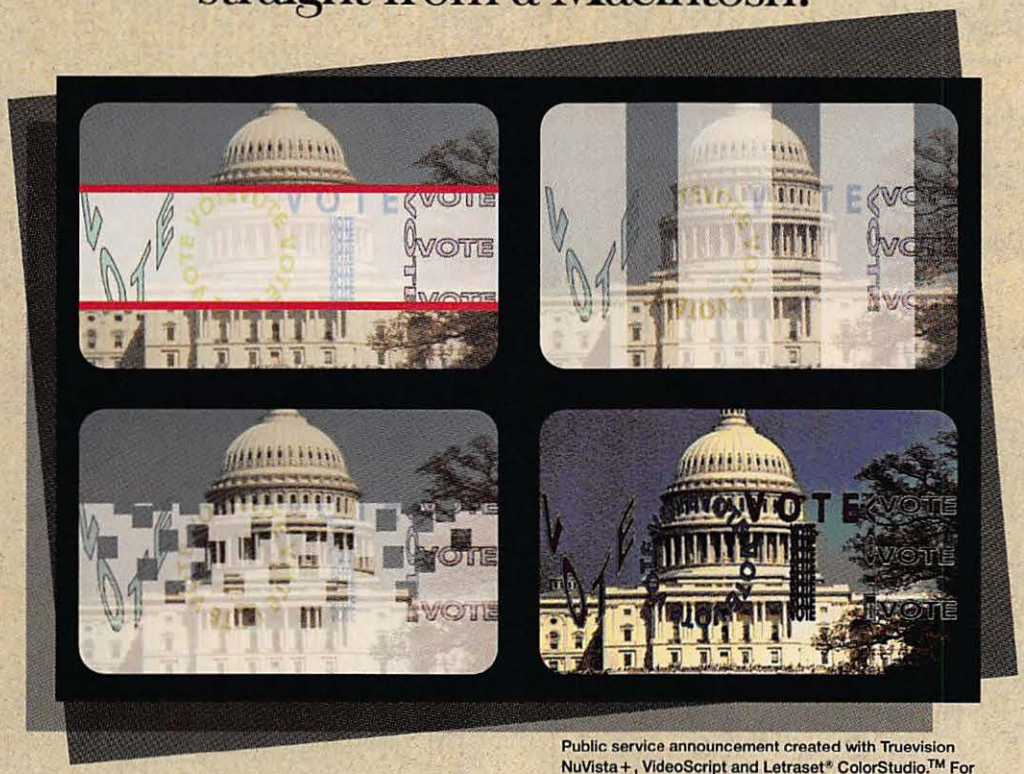
If you manage an office of Excel, Wingz, or WordPerfect users who sometimes use a password to protect their documents, you should have a copy of MasterKey on hand. The password protection in Excel, Wingz, and WordPerfect should be used to prevent people from inadvertently altering data on protected files, not for security purposes. But it goes without saying that MasterKey should only be used when a user forgets his or her password, and not used to pry into files.

Southwest Collection

This eight-volume collection of EPS clip art of the Southwest ($129.95 each, $699.95 for the set from Grafx Associates) includes images based on designs from Navajo rugs and blankets, Hopi kachina faces and ceremonial garments, Zuni stone inlays, Apache bead designs, and other Native American artwork plus border elements, custom Southwest typefaces, and miscellaneous Southwest graphics. The art has striking colors and beautifully intricate patterns. If you have occasion to use Native American designs in your computer art, this is an excellent clip art collection for you. ■

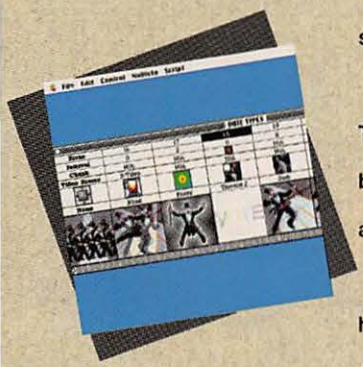
See **Where to Buy** *for contact information.*

"With Truevision NuVista+ and VideoScript,™ we produce broadcast commercials straight from a Macintosh.®"



Public service announcement created with Truevision NuVista+, VideoScript and Letraset® ColorStudio.™ For more information on 2PM Multimedia, call 703/636-4142.

Now you can script and produce professional videos on your Macintosh using VideoScript software with any Truevision NuVista+ or NuVista graphics engine. With VideoScript, you create a series of 'events' by defining duration and speed for transitions between graphics and video. The VideoScript interface lets you quickly master the basic transitions, yet allows access to more sophisticated effects for truly dazzling video productions.



Special effects for live video include capture, strobe and posterization. There are 28 transitions (wipes, pushes, reveals and blends) with selectable borders and border colors. And unlike other programs, these transitions all run at 16 bits/pixel for the highest quality real-time effects available on a Macintosh.

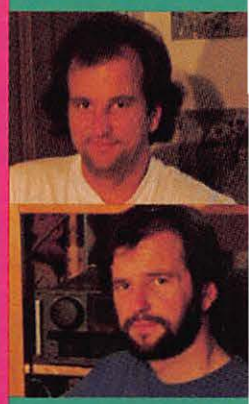
Truevision is well known in the broadcast industry for providing the highest quality video output. With VideoScript, you can make the most of the advanced features of the Truevision NuVista+. Improve the quality of *your* video output by using this powerful combination in your next production.

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U.K. 44-628-77-7800 West Germany 49-89-612-0010 Other international 617 / 229-6900

**Order any model NuVista+ by July 15, 1991 and receive VideoScript at no extra cost (U.S. domestic offer). International offer extends through August 1, 1991.*
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James and Charles Wine
2PM Multimedia
Linden, VA

"Right now, video is getting hot on the Mac. Truevision has been in the broadcast field for years, and that counts for a lot."

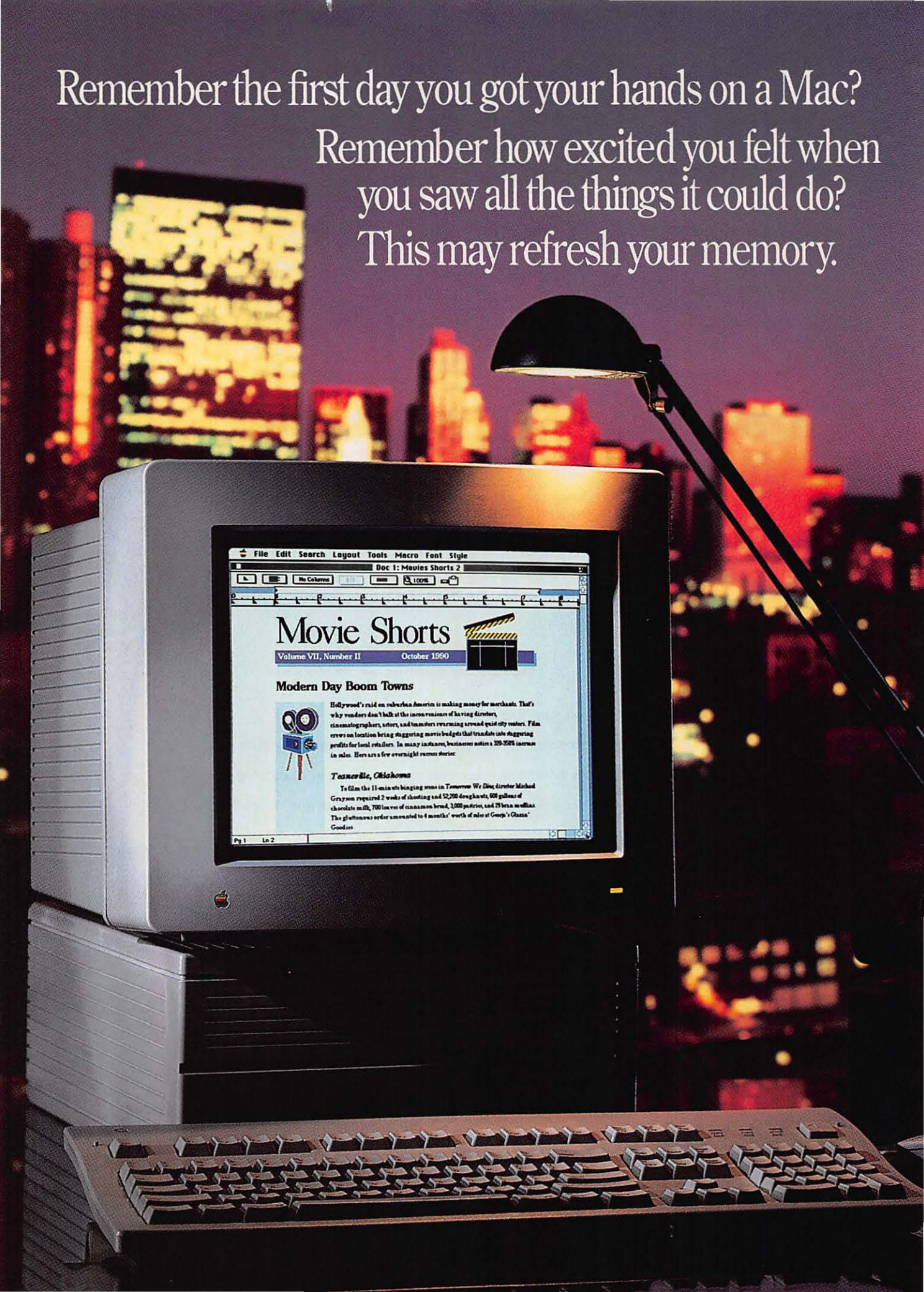
Call 800-858-TRUE
For more information

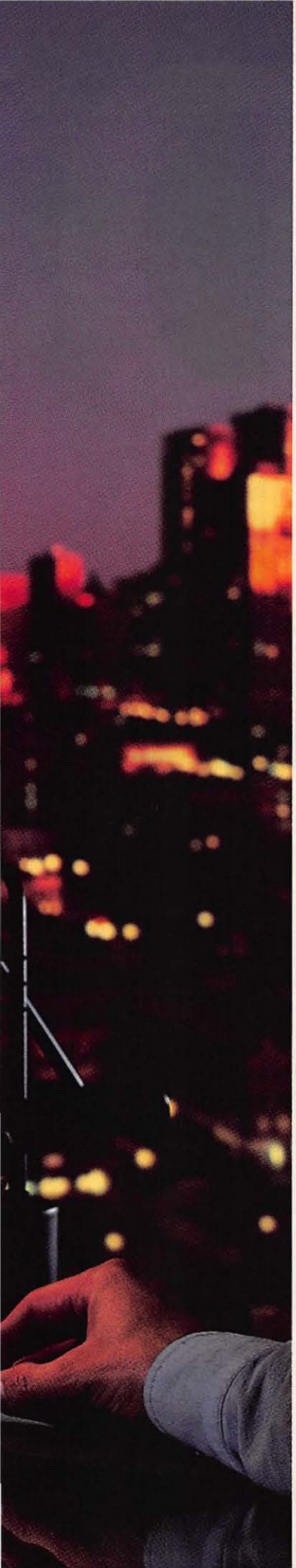
©1991, Truevision, Inc.

Remember the first day you got your hands on a Mac?

Remember how excited you felt when you saw all the things it could do?

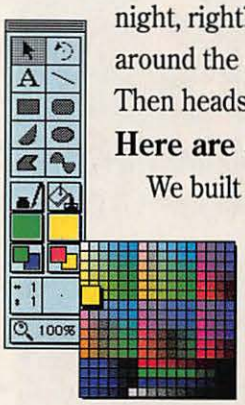
This may refresh your memory.





Introducing WordPerfect® 2.0.

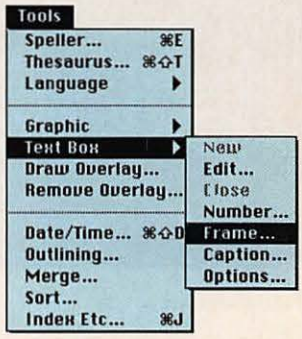
Every once in a while a new product comes along that sparks the same kind of excitement you may have experienced with your first Macintosh (you stayed up half the night, right?). As we've shown new WordPerfect® 2.0 to Macintosh users around the country, we've seen a very similar reaction. First eyes open wider. Then heads start to nod. Followed by grins that stretch dimple to dimple.



Here are some of the more graphic improvements.

We built a graphics and drawing package right into the program. With WordPerfect 2.0, you don't have to leave your document to incorporate graphics. You can create, edit, size, scale and crop graphic figures just by clicking "graphics" or "draw" on the pull-down menu. The palette includes all of the standard drawing tools, plus Bezier curves, polygons and a free rotation tool.

WordPerfect 2.0 also lets you create text boxes. Inside your text boxes you can change font size and attributes. Then you can drag your text box wherever you want in your document and the rest of your text will wrap around it automatically.



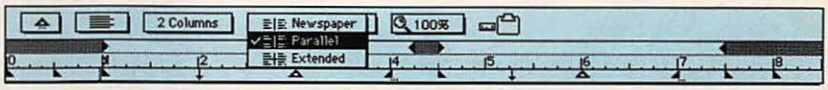
The list of new features could fill a page. Or up to 24 columns.

By clicking and dragging icons on the new WordPerfect ruler, you can create columns (newspaper or parallel) and then adjust the column settings, align text, set tabs, change line spacing, move margins and do a number of other formatting changes to your document.

Want to add a border to text, paragraph, column, or page? Easy. WordPerfect 2.0 gives you 36 different border styles from which to choose.

Like working with Styles? WordPerfect not only lets you use them, you can also share your styles with other people on your network.

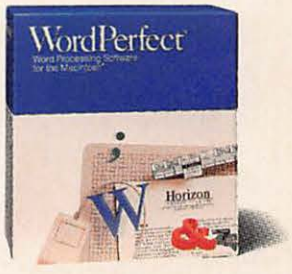
We've also added new features like a Macro Editor, Tables of Authorities, and Line Numbering. And we've made enhancements to Merge, Search and Replace, and Macros.



Of course, what counts is how you feel.

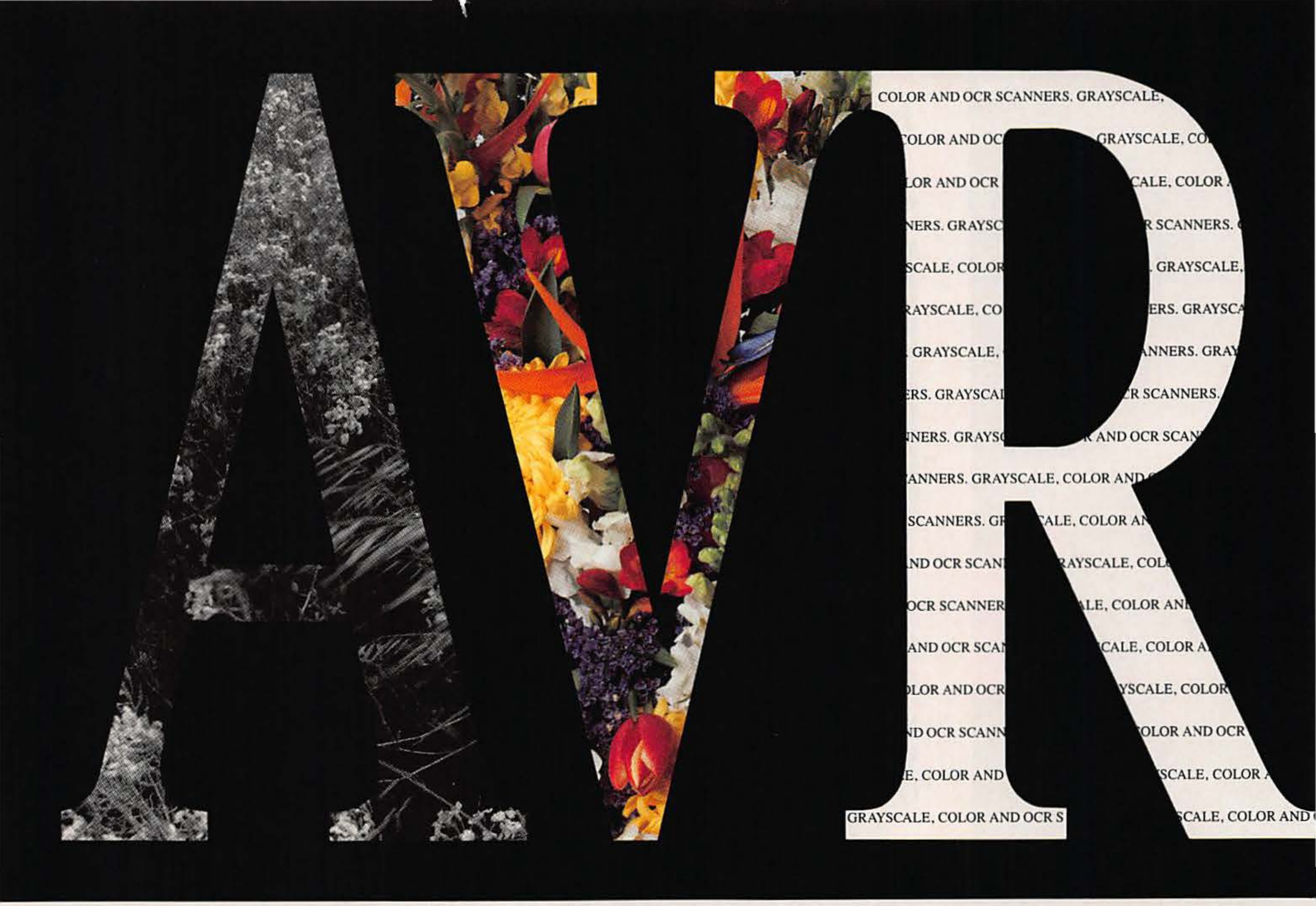
See WordPerfect 2.0 up and running at your dealer. Better yet, buy a copy of WordPerfect 2.0 and load it onto your Mac. But when you try WordPerfect 2.0 for the first time, one word of warning. Don't plan on going to bed early.

For more information, call us at **(800) 526-5034.**



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NEW PRODUCTS

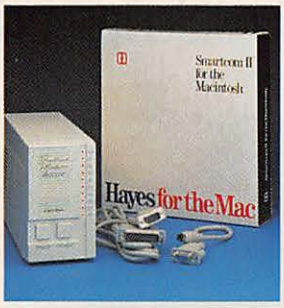
Edited by
Mary Margaret Lewis

This section covers Macintosh products formally announced but not yet evaluated by Macworld. All prices are suggested retail. Please call vendors for information on availability.

HARDWARE

9600 SmartPack

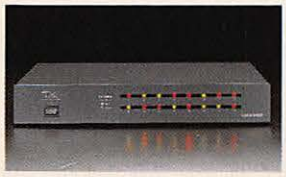
Modem communications package that includes full-duplex CCITT V.32/V.42/V.42bis stand-alone modem and Hayes's SmartCom II for the Mac, plus a Mac hardware flow-control cable. $759. Practical Peripherals, 818/706-0333.



9600 SmartPack

LocalSwitch

16-port packet-switching hub for Mac networks that creates parallel links between its ports to increase traffic speed on LocalTalk networks. Unit takes the place of LocalTalk multiport repeaters. Uses twisted-pair adapters, phone wiring, and 50-pin plugs. Automatically determines network configuration up-



LocalSwitch

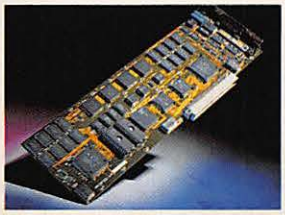
on installation. $3495. Tribe Computer Works, 415/547-3874.

MacCon+LC

Board for the Macintosh LC that includes ports for both thin coaxial and 10BaseT unshielded twisted-pair networks, as well as a socket for a floating-point math coprocessor. $379. Asante, 408/734-4844.

MacDSPII

50-MFLOPS digital signal processing board that serves as a NuBus bus master and runs Apple's A/ROSE multitasking real-time operating system. Board includes a NuBus timer that allocates a fixed interval of time for each task. Board provides a C-language development environment, which includes a compiler, assembler, simulator, and linker; board runs under Apple's MPW. $7995. Spectral Innovations, 408/727-1314.



MacDSPII

MousePen Professional

Input device that has a small, cylindrical case that resembles a pen; operates by friction rather than gravity. Device can be used at any surface angle and on any soft surface that a ballpoint pen writes on. Plugs into ADB port. $109. Appoint, 805/239-8976, 800/448-1184.

OcéColor PostScript Printer

Color PostScript printer that can output two-page layouts at full scale. Printer is capable of producing 11.7-by-17.1-inch color image. Uses a 300-dpi color thermal wax-transfer method to print on both cut-sheet paper and overhead transparency film. $14,000 to $17,000, depending on configuration. Océ Graphics, 415/964-7900.



OcéColor PostScript Printer

RAMslot and LXPi RAM Cards

RAMslot is a stand-alone 3MB pseudostatic RAM board that fits in the RAM expansion slot of the new Mac Portable. Upgrades the new Portable to 4MB of usable RAM. Comes with expansion connectors that allow user to add multiple LXPi expansion boards. The LXPi boards fit in the processor direct slot of any version of the Mac Portable. RAMslot $745; LXPi RAM Cards $645 each. PSI, 408/559-8544.

Scanmaster 3+

Midrange color flatbed scanner that produces line-art–quality scans for publishing and graphic arts professionals. Can scan reflective and transparent surfaces, at a range of 75 dpi to 1200 dpi. $9195. Howtek, 603/882-5200.



Scanmaster 3+

Silhouette

Trackball in a contoured case designed to support the wrist. $99.95. EMac, 415/683-4881.



Silhouette

SOFTWARE

AgentDA

Schedule- and meeting-management software that

(continues)

gives user the ablity to display a monthly schedule for daily tasks and appointments. User clicks and drags to move information to different sections of scheduling calendar. Desk accessory generates reports with headers and footers, and includes audiovisual reminders that alert user when meetings scheduled in the application are about to begin. 1MB min. memory. $99. TeamBuilding Technologies, 514/278-3010.

Armenian PostScript Type 1 Font

Package containing six typefaces of the two traditional families of Armenian type, Barz and Nork. These faces are compatible with all word processing and graphics programs. 1MB min. memory. $395. LFO, 818/507-4433.



Armenian PostScript Type 1 Font

AutoMizer Vehicle Management System

Automobile maintenance tracking system that comes with an 80-page journal to track auto repairs and upkeep. Comes in nylon organizer that fits in glove compartment. Software calculates cost per mile and per month of driving a vehicle, insurance, and financing; keeps a record of maintenance history, cost history, business use, and tax deductibility. Can generate reports. 1MB min. memory. $29.99; without software $9.99. Four Peaks Intelligent Systems, 602/839-8774, 800/553-0363.



AutoMizer Vehicle Management System

BackFax/Send Only

Software for fax modems that use the Sierra Sendfax chip and run at 9600 bps or 4800 bps. Includes the same sending features as the full BackFax program. Runs in the background with or without MultiFinder, and comes with a set of fax fonts. 1MB min. memory. $149. Solutions, 802/865-9220.

Backgrounds for Multimedia

Set of 40 color background images for use with desktop presentations, slides, 3-D modeling programs, animation, or video. Images can be placed into any animation, presentation, 3-D rendering, or image-manipulation program that imports 8-bit PICT format. 2MB min. memory. $289. Artbeats, 714/881-1200.

Baobab Individual Learning Courses

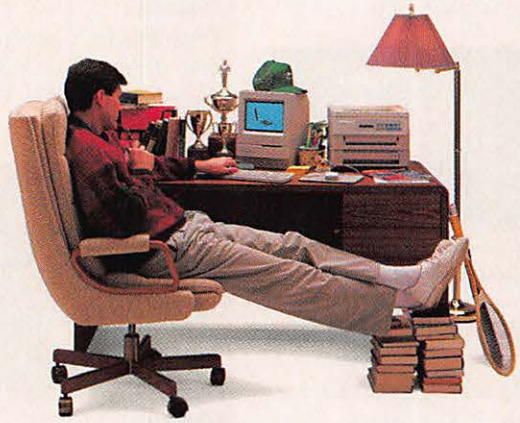
Self-paced courses for MacDraw II, MacWrite II, MacProject II, and FileMaker Pro. Comes with audiocassettes, workbooks, and disks of examples. Courses are divided into brief lessons consisting of a setup statement, a hands-on audio demonstration, and an exercise. 1MB min. memory. $79.95 each. Baobab, 408/356-9983.

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Plus it's only 13.4″ wide and 14.2″ deep – a natural deskside companion for any Mac. In fact, *MACWORLD* says, "The likable little microLaser is the best all-around value."† **Company office. Great company.** For more power where power counts, there's the $2,644* microLaser PS35 with 35 scalable fonts. *MacUser* calls it "The clear winner in the personal printer category....It gives you more bang for the buck and outperforms all its competitors in most performance tests."‡ **Shared office. Shared printer.** Now here's the right match for one Mac or many. In fact, the 16 ppm microLaser XL is a natural fit for an AppleTalk® network. And like its slightly smaller cousin, this workhorse printer offers you either 17 or 35 scalable fonts, priced at

and shareware Macintosh programs, including items released by the Arizona Macintosh Users Group. Provides text files describing each topic, and has an Allfiles.db text file that gives name, size, version, and description for all files on the disk. Files are compressed. Text file directory is tab delimited for import into other databases. 1MB min. memory. $119. MacWizards, 602/892-5454.

Bridges

Interactive color-publishing tutorial that runs on Mac II and later versions. Helps desktop publishing professionals gain insight into electronic color. Contains sections on color theory, electronic images, prepress methods, and printing methods. 4MB min. memory. $39.95. Pre-Press Technologies, 619/931-2695.

Disk Accessory Plus

Desk accessory that automatically creates labels for disks. Lists file and folder names directly on label. Works with ImageWriters, LaserWriters, and compatible printers. 1MB min. memory. $10. Vertical Solutions, 503/671-0511.

EasyShare

AppleShare-compatible file server that publishes up to ten folders or disks at one time. Runs in the background, has password protection, and supports a variety of Mac databases. 1MB min. memory. $149. Symmetry, 602/998-9106.

Grace Notes & Crescendo

Two music-notation fonts designed by composer Wendy Carlos. Both are Type 1 and ATM fonts and are compatible with desktop publishing programs and Finale from Coda Music Software. The one-disk package includes standard music symbols and parts, as well as symbols for nontonal percussion instruments, tonal percussion instruments, mallets and drumsticks, Gregorian chant, organ, damper and hard pedals, expression, and modern music. 1MB min. memory. $89.95. Casady & Greene, 408/624-8716, 800/359-4920.

HardBall II

Baseball-simulation game for one or two players in which players assume the role of team managers to supervise players and control their on-screen performance. Users determine the batting order, lineups, substitutions, and position swaps of team players. 1MB min. memory. $54.95. Accolade, 408/985-1700.



HardBall II

InfoLynx

Presentation software for combining graphics with text and sound. Program can be set up interactively—the user clicks on buttons to advance through a show—or as an automated slide sequence. Presentation files do not require the application to be run. 512KE min. memory. $495. InfoTouch, 315/426-0513, 315/426-0515.

MacEKG

Macintosh repair and reference software that runs as an INIT. Performs 35 di-

(continues)

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Find out where you can pick the right microLaser for your Mac. Call 1-800-527-3500.

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TEXAS INSTRUMENTS

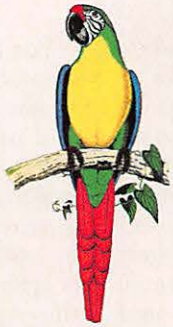
©1991 TI 71827

*TI suggested retail price. (Dealer prices may vary.) ‡*MACWORLD*, October 1990. ‡*MacUser*, October 1990. microLaser is a trademark of Texas Instruments Incorporated. Macintosh, AppleTalk and LaserWriter are registered trademarks of Apple Computer, Inc. Adobe, and PostScript are registered trademarks of Adobe Systems, Inc.

agnostic tests each time user starts up the computer. A digital voice announces diagnostic results when tests are complete. Program displays system's performance characteristics; analyzes how alterations, such as the installation of INITs and cdevs, will affect the system; and warns of possible corruption within these items. 1MB min. memory. $99. Micromat Computer Systems, 415/898-6227.

MacPalette II

Color printer driver for ImageWriter II that produces full color using a standard ImageWriter four-color ribbon. Available from the Chooser, includes online help, and is compatible with Adobe Type Manager. 1MB min. memory. $69. Microspot, 408/253-2064, 800/622-7568.



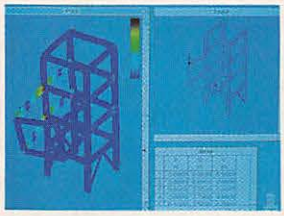
MacPalette II Output

Microsoft Word Toolkit

Add-on package for Microsoft Word 4.0. Contains more than 20 style sheets and text files that help the user learn the ins and outs of working with Word. Takes a systematic, step-by-step approach. 1MB min. memory. $29.95. Computer Resources, 209/394-8188.

Multiframe

Structural-analysis and design software. Provides a three-dimensional interface with spatial controls for viewing a rendered structure on screen and for selectively displaying areas of the structure using criteria such as geometry or section type. 1MB min. memory. Three-dimensional version $1495, Section Maker $395. Graphic Magic, 408/464-1949.



Multiframe

NetPatrol Pack

Bundle of network-management software for monitoring, troubleshooting, and optimizing networks over multivendor LANs. Includes EtherPeek Ethernet network analyzer, LocalPeek LocalTalk network analyzer, and Net Watchman AppleTalk network monitor. 1MB min. memory. $1195. The AG Group, 415/937-7900.

Off-Line CD-ROM

Collection of international freeware and shareware. 500MB of software demos selected by *M Macintosh Magazine*. 1MB min. memory. $199. *M Macintosh Magazine*, MGE Communications srl-00192 Roma, Italy viale delle Milizie 38.

Oids

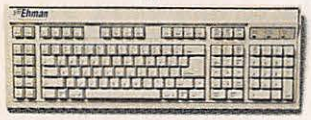
Arcade-style adventure game that puts user in the pilot's seat of a fighter spacecraft. Player's job is to rescue Oids, robots being exploited by a sinister civilization. Comes with game editor for creating scenarios that can be traded

(continues)



When You're Selling A Keyboard This Advanced For A Price This Low, Why Even Try To be Subtle?

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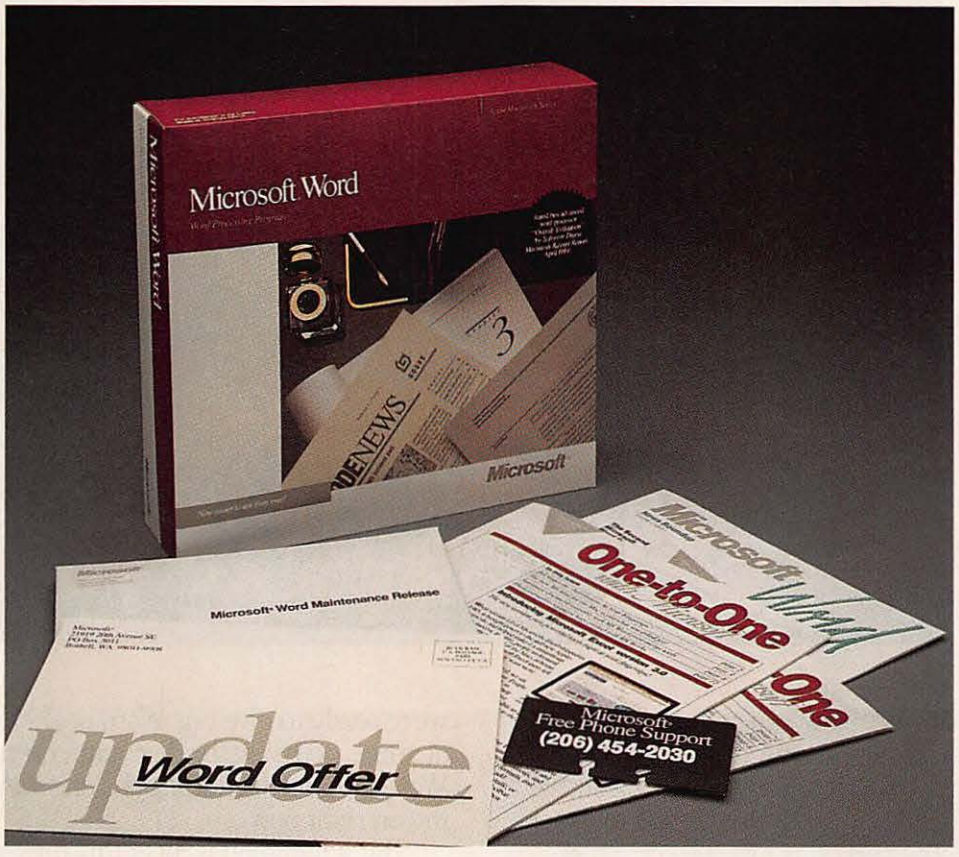


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We've tried just about everything to get in touch with Microsoft Word users.



But now, we're really pulling out all the stops.

The fabulous Microsoft Mouse Pad.



Yes, it's true. Now you too can point and click your way through your Microsoft® Word documents in style, with the exclusive Microsoft Mouse Pad. But why, you may ask, are we *giving away* this fabulous designer original? It's quite simple, really.

You see, there are lots of you out there using Microsoft Word. Over a million at last count. And Microsoft has a strong commitment to each and every one of you. Which is why we've assembled a dedicated group of technical experts ready to give you unlimited phone support, whenever you have a question or problem. Collected new tips and Word techniques to pass on to you. Printed up a warehouse full of free newsletters, reports and application notes. And—best of all—we're ready to give our Word users first crack at some pretty hefty discounts on future Word updates (including the one we're working on right now).

But what good is all of this if we can't get in touch with you...because we don't know your name and address? That's why we're asking you to fill out one of these brief little Microsoft Word registration cards. And why we're willing to part with our beloved Mouse Pads. We know there's over a million of you out there. We just don't know where. So mail us a card today. And let's keep in touch, okay?

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If you do get in touch, you'll be glad you did. And so will we. We'll make sure you get really great discounts on future Word updates plus a lot of valuable freebies, like application notes and newsletters.

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My signature below certifies that I am a Microsoft Word user and have not yet registered my copy of Word

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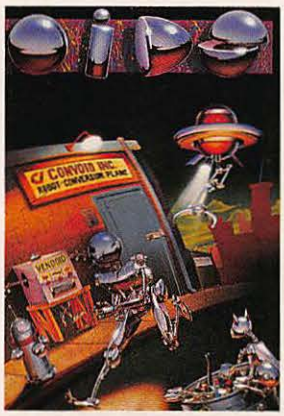
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Oids

with other Oids players. 1MB min. memory. $44.95. FTL Games/Software Heaven, 619/453-5711.

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File-selection software that installs in the Control Panel and creates miniature depictions of the opening screens of files created within an application. Program works with any software, and runs under the Finder. Miniature representations help user locate the image of a desired file; double-clicking on the image launches an application and opens selected file. 1MB min. memory. $89.95. Right Answers, 213/325-1311.

PictureLink

Add-on software for 4th Dimension and File Force database products from ACIUS. Captures color images from live video and scanners. Contains color paint program for retouching. Images can be stored directly in database fields. Program supports Apple's Macintosh Communications Toolbox, which can be used for sending and receiving images from remote systems and scanners. 1MB min. memory. $395. Media Lab, 415/345-4620.

RoboSport

Battle-simulation game, set in the future. Teams of robots do battle in 24 arenas of 3 basic types: a suburban street, a devastated town, and a giant computer logic board. Game has VCR-style controls that enable user to replay battle scenes in order to analyze strategies. 1MB min. memory. $59.95. Maxis, 415/376-6434.



RoboSport

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Network-management software that enables user to create a real-time map of all AppleTalk nodes on a network, including servers, printers, and routers. Sets up alarms for various network events. Collects traffic statistics and plots them on a real-time graph. Generates reports for capacity planning and trend analysis. 5MB min. memory. Base model for networks of 100 Macintoshes or less $897; site license available. Distributed Technologies, 617/684-0060.

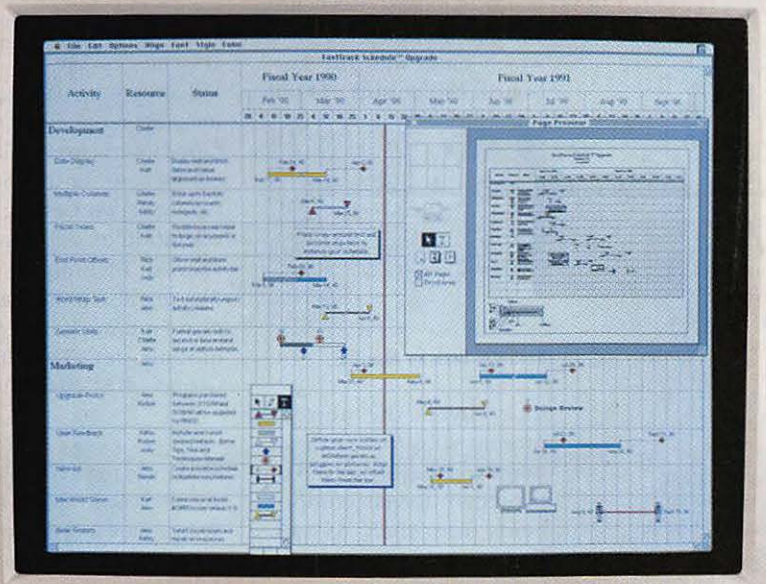
ACCESSORIES

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Vinyl dustcovers that protect personal computer equipment. Two-piece sets available for Macintosh SE or Plus with regular or extended keyboard, Mac II or fx with extended keyboard, ImageWriter II, and LaserWriter II. $13.95 to $19.95. Curtis Manufacturing, 603/532-4123.

(continues)

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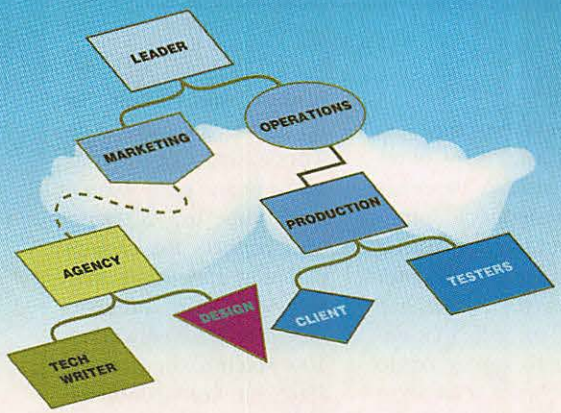
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Circle 83 on reader service card



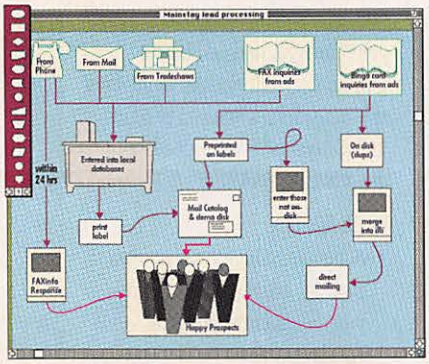
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MacUser, July 1991

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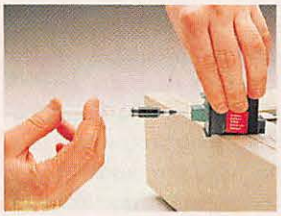
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Agoura Hills, CA 91301
(818) 991-6540
fax (818) 991-4587

Circle 284 on reader service card.

JetFill

Device for refilling Hewlett-Packard's DeskWriter ink cartridges. The refilling unit is a syringe; user inserts needle into small hole at top of DeskWriter cartridge and depresses plunger to inject new ink into cartridge's reservoir. Designed to refill the ink cartridges at least five times. Inks are water-resistant and available in black, red, blue, green, and brown. Single unit $12.95, two-pack $19.95. JetFill, 512/469-5648, 800/235-9748.



JetFill

Keyboard Lock for Mac IIsi

Keyboard lock that disables keyboard to prevent unauthorized access. Programs can be running while keyboard is locked. Keyboard cable plugs into a lockbox, which plugs into the keyboard cable port. Metal



Keyboard Lock for Mac IIsi

lock covers the port to prevent substitution of an unsecured keyboard and to protect internal components from theft. $99.95. PC Guardian, 415/459-0190, 800/288-8126.

Wrist Pad

Wrist pad that sits in front of keyboard and provides cushion for wrists. Comes with nonskid base; available in black, red, blue, mauve, and turquoise. $19.95. Silicon Sports, 415/854-1456, 800/243-2972.



Wrist Pad

BOOKS & VIDEOS

Farallon's MediaTracks: The Ultimate Training Tool

Guide to using Farallon's MediaTracks: covers recording a training session; editing it; adding sound to a tape; annotating the tape with buttons, arrows, and overlays; and replaying it. Provides nine overviews, each using MediaTracks for different task; gives tips on how to integrate MediaTracks with other Mac programs. $37.50. Business One Irwin, 708/206-2700.

PageMaker 4.0 Video Training Package

Video training package that includes a one-hour videotape, interactive disk with examples, and 75-page manual. Two Getting Started modules and two Advanced Techniques modules are also available. 1MB min. memory. $475 per module set. The Pollard Group, 415/736-0400. M

To have your product considered for inclusion in *New Products,* send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number (and two copies of the software) to New Products Editor, *Macworld,* 501 Second St., San Francisco, CA 94107. *Macworld* reserves the right to edit all product announcements.

Just When The Competition Thought It Was Catching Up.



The New Series 1300.™

Defining the Next Standard for Storage.

The MacinStor® Series 1300 from Storage Dimensions. More speed, more capacity and more reliability than any Macintosh® storage systems you've ever used.

At the heart of every Series 1300 model is a drive mechanism with remarkable specifications. 11.5 ms average seek time and 5400 RPM spindle motor to dramatically improve access to your data. 1.3 gigabytes formatted capacity. And MTBF ratings that can be measured in decades. But it takes more than just numbers to set a new standard.

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It's what you do with the numbers that counts. Our Series 1300 has transformed them into storage solutions with unparalleled performance and reliability. We applied our fully integrated, systems engineering approach to the design. And we added our new Data Cannon® family of SCSI co-processors to further increase performance by up to 250%.

The MacinStor Series 1300 is available today for your high-performance Macintosh applications, in subsystem capacities from 1.3 to 5.3 gigabytes. To build Mac® systems to over 40 gigabytes. Now those are numbers — mainframe-level numbers — your systems can really put to work.

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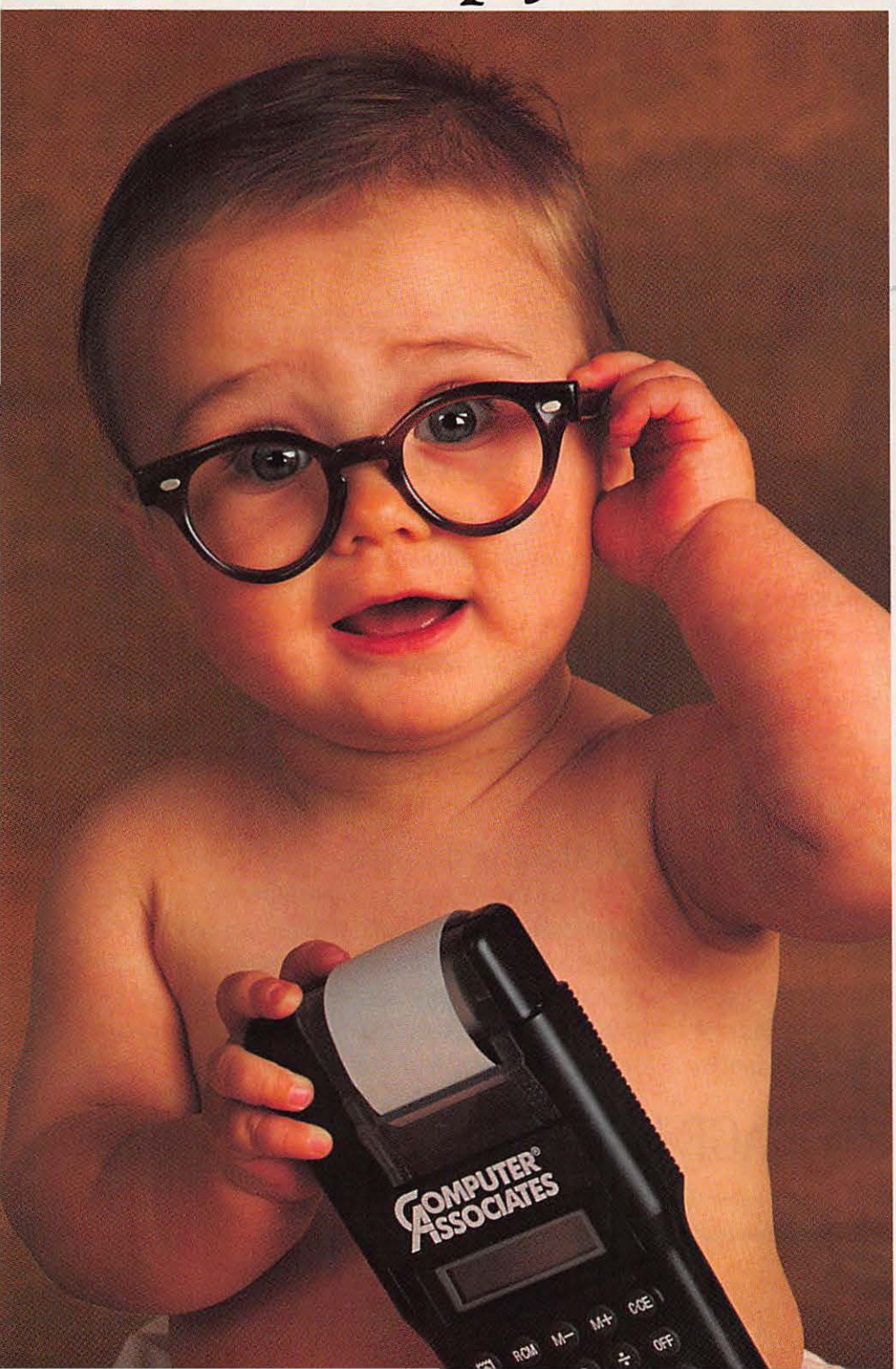
Cutting edge technology. Innovative design. Comprehensive systems focus. Three reasons our Series 1300 is the latest example of how the Number One company in Macintosh mass storage stays out in front. Call toll free **(800) 765-7895.** Storage Dimensions, 2145 Hamilton Avenue, San Jose, CA 95125.

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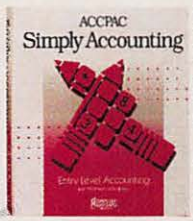
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Don't be stuck on sticky notes. Organize your messages and reminders in File Director's autodialing phone pad DA.



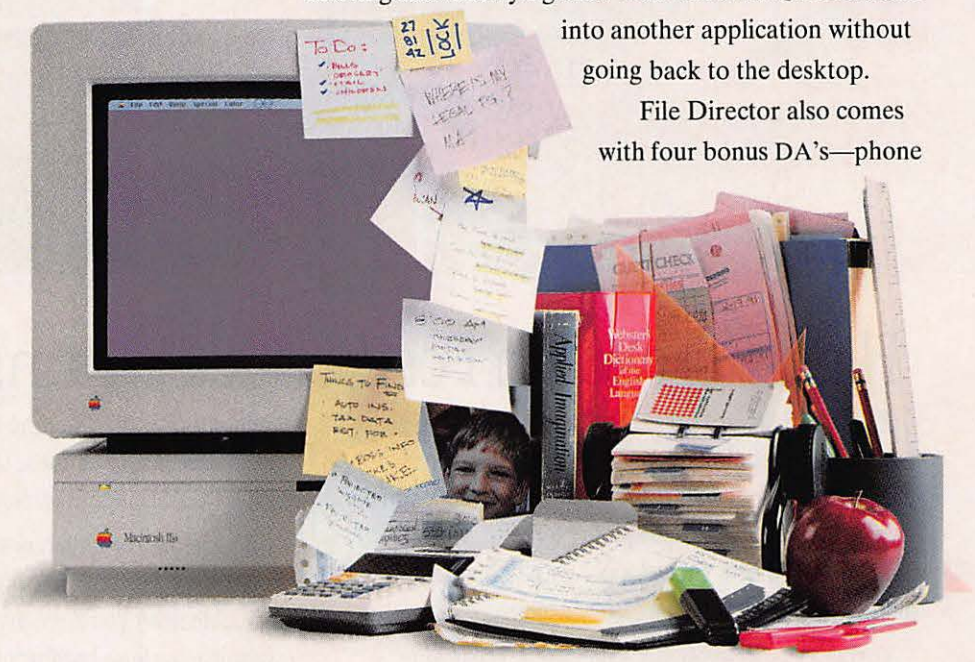
Pop up the calendar DA while you're in any application to make notes or schedule cold calls and hot dates.

It's a contradiction we humans have been living with for millions of years: one brain, two ways of thinking. The right half of the brain is creative and carefree, while the logical left hemisphere is designed to put things in order. So when you try to get your head together and organize your hard disk, the result can be a filing system that doesn't work for either half.

That's why you need File Director,™ the left-brained program for right-brained people. File Director makes everyday operations easier by letting you logically arrange your files, folders, documents and applications on "pages" by date, job, client or whatever makes sense to you.

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File Director also comes with four bonus DA's—phone



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And keep this in mind. We'll send you a free copy of Pyro!,™ the entertaining screen saver (a $39.95 value), just for writing "Pyro!" on the File Director registration card before you return it. For more information, call 1-800-477-8212 today.



Two of File Director's DA's are powerful Scientific and Reverse Polish Notation calculators. No batteries required.



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File Director from Fifth Generation Systems, Inc.

Circle 73 on reader service card

Fifth Generation Systems, Inc. 10049 N. Reiger Road Baton Rouge LA 70809 Technical Support: (504) 291-7283

Quick Tips

MEMORY-CONFIGURATION RULES, THREADING STORIES IN PAGEMAKER, TRIMMING PHOTOSHOP WINDOWS, AND MORE

BY LON POOLE

Several readers reported problems accessing user levels above Typing in the version of HyperCard bundled with new Macs by typing the command **magic** in the Message box (as described in last April's *Quick Tips*). According to Claris, the command works if you are at the last card of the Home stack. There are a number of ways to get there, including choosing Preferences from the Home menu.

Another method, which works anywhere in HyperCard, is to type the command **set userlevel to 5** in the Message box. After doing that, James D'Angelo of Philadelphia suggests you go to the last card in the Home stack, choose the Button tool from the now-available Tools menu, click to select the large empty button that covers the Painting, Authoring, and Scripting buttons, and press the delete key to remove it. Anthony W. Rinaldi, also of Philadelphia, had to use the Field tool to remove two opaque fields that covered the Painting, Authoring, and Scripting buttons on his User Preferences card.

A related tip comes from Paul Clatworthy of Redondo Beach, California. Tired of typing **set userlevel to 5** and **set userlevel to 2** in the Message box to change the user level when developing HyperCard stacks, he wrote the following message handler and put it in the stack script of his Home stack:

```
—Abbreviation for setting user level
on u x
  set userlevel to param(1)
end u
```

Now he changes the user level by typing the letter **U**, a space, and the user-level number (for example, **u 5**) in the Message box and then pressing the return or enter key. You can use the same technique to abbreviate other HyperCard commands, such as those for locking and unlocking fields or showing and hiding fields or buttons.

Tracking Deleted Files

Another tip in April warned that file-recovery programs can't restore items that have been displaced from the list of deleted documents that those programs keep for each disk. If you print in the background or use applications that create and delete lots of temporary files, you increase the risk of having important deleted documents bumped from the list. Joseph C. Hilton of Brandsby, York, England, solves the problem by partitioning his drive into three volumes, with the System Folder in one volume, programs in another, and documents in the third. Because most temporary files are created in the system volume, their automatic deletion doesn't clog the list of documents deleted from the documents volume. SUM II, The Norton Utilities for the Macintosh (both by Symantec, 408/253-9600), and MacTools Deluxe (Central Point Software, 503/690-8090) can all partition hard drives, and they track deleted files separately for each volume. In addition, backups go more quickly and easily when the programs and system software are in separate volumes.



Improving Your Memory

Q Can I increase the RAM in my Mac IIsi from 2MB to 3.5MB by replacing only two of the original 256K SIMMs with 1MB SIMMs, or must I replace all four?

Matthew Miller
Grand Rapids, Michigan

A You must replace all four SIMM (Single Inline Memory Module) chips in a IIsi. The table "Up Your MBs" summarizes memory-configuration rules for most Macintosh models.

Removable Compatibility

Q Is there a standard for removable-cartridge hard drives that use the 45MB SyQuest mechanism? Different vendors supply different driver software in the form of system extensions (also called start-up documents and INITs). If I want my Brand-A drive to recognize cartridges formatted by Brands B, C, and D, must my System Folder contain system extensions for all of them?

Roger Rodrigues
Burr Ridge, Illinois

(continues)

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"I was finished spellchecking the first 25 pages of my thesis - I stretched and yawned as I saved the document and as I stretched, I kicked the power cord..."

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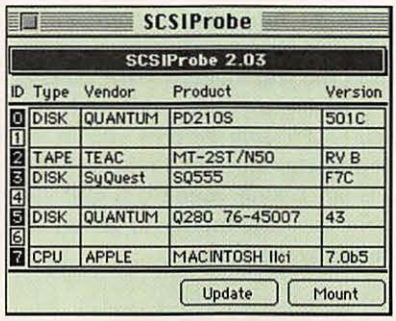
UP YOUR MBs

Model	Total RAM	RAM Configuration	SIMM Speed
Mac Plus,	512K	two 256K SIMMs	150ns
Mac SE	1MB	four 256K SIMMs	
	2MB	two 1MB SIMMs	
	2.5MB	two 1MB SIMMs + two 256K SIMMs	
	4MB	two 1MB SIMMs + two 1MB SIMMs	
Mac Classic	1MB	1MB fixed	120ns
	2MB	1MB fixed + 1MB expansion card	
	2.5MB	1MB fixed + 1MB expansion card + two 256K SIMMs	
	4MB	1MB fixed + 1MB expansion card + two 1MB SIMMs	
Mac LC	2MB	2MB fixed	100ns
	4MB	2MB fixed + two 1MB SIMMs	
	6MB	2MB fixed + two 2MB SIMMs	
	10MB	2MB fixed + two 4MB SIMMs	
Mac SE/30,	1MB	four 256K SIMMs	120ns
Mac II,	2MB	eight 256K SIMMs	
Mac IIx,	4MB	four 1MB SIMMs	
Mac IIcx	5MB	four 1MB SIMMs + four 256K SIMMs	
	8MB	eight 1MB SIMMs	
	16MB	four 4MB SIMMs	
	17MB	four 4MB SIMMs + four 256K SIMMs	
	20MB	four 4MB SIMMs + four 1MB SIMMs	
	32MB	eight 4MB SIMMs	
Mac IIsi	2MB	1MB fixed + four 256K SIMMs	100ns
	5MB	1MB fixed + four 1MB SIMMs	
	9MB	1MB fixed + four 2MB SIMMs	
	17MB	1MB fixed + four 4MB SIMMs	
Mac IIci	1MB	four 256K SIMMs	80ns
	2MB	eight 256K SIMMs	
	4MB	four 1MB SIMMs	
	5MB	four 1MB SIMMs + four 256K SIMMs	
	8MB	eight 1MB SIMMs	
	9MB	four 2MB SIMMs + four 256K SIMMs	
	12MB	four 2MB SIMMs + four 1MB SIMMs	
	16MB	four 4MB SIMMs	
	17MB	four 4MB SIMMs + four 256K SIMMs	
	20MB	four 4MB SIMMs + four 1MB SIMMs	
	24MB	four 4MB SIMMs + four 2MB SIMMs	
	32MB	eight 4MB SIMMs	
Mac IIfx	4MB	four 1MB SIMMs	80ns
	8MB	eight 1MB SIMMs	
	16MB	four 4MB SIMMs	
	20MB	four 4MB SIMMs + four 1MB SIMMs	
	32MB	eight 4MB SIMMs	

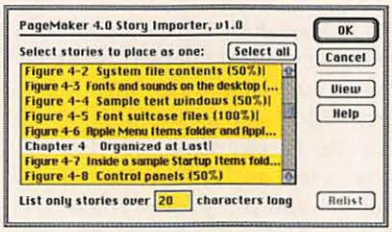
UP YOUR MBs Different Macs have different RAM-configuration options. On a Plus, SE, SE/30, II, IIx, or IIcx, you must install SIMM (Single Inline Memory Module) chips in the correct slots; ask your SIMM dealer for details. To get the benefit of installing more than 8MB, you need System 7 with 32-bit addressing turned on, 32-bit-clean software, and 32-bit-clean ROMs (currently the LC, IIsi, IIci, and IIfx have them); the A/UX operating system; or the Maxima utility for System 6 or System 7 from Connectix (415/324-0727). You can use higher-speed SIMMs than the minimum requirement listed in the table (the lower the ns rating, the faster the SIMM speed) as long as each set of four SIMMs (each pair on a Plus, SE, Classic, or LC) is the same speed.

A There is no standard, but you can define your own by having everyone format all their cartridges with the utility program from one manufacturer. Warning: Formatting erases all disk contents, so back up before formatting a disk that's in use. If you can't get everyone to use the same formatting utility, don't worry and don't load up your System Folder with different brands of removable-disk system extensions. You need only one of those, and you can get by with none (like I do). You may find that when you insert a cartridge, its icon doesn't appear on your desktop. No problem—use Robert Polic's SCSIProbe control panel to mount the cartridge icon, as shown in "Mount Up." You use SCSIProbe only once, not each time you change cartridges, until you restart the Mac.

Two other utilities—the SCSI Tools control panel by Paul Mercer and the MountEm function key (F-Key) by Bill Steinberg—also mount SCSI drive icons. All three programs are available by mail from many user groups, including BCS Mac (617/625-7080). You can also get them via modem from electronic bulletin boards and commercial information services.



MOUNT UP Clicking the Mount button in the SCSIProbe control panel guarantees that the icon of a just-inserted removable cartridge will show up on the desktop.



ONE IMPORTED STORY You can combine multiple PageMaker stories by using the Place and Import commands. Those commands display a list like this one, in which you shift-click to select the individual stories you want to thread.

Threading Stories in PageMaker

TIP: The most convenient way to edit captions or other separate small stories scattered throughout a lengthy PageMaker 4.0 publication is to combine, or thread, them into one story and use the story editor.

Instead of tediously paging through the publication, shift-clicking each story, cutting the selected group, and pasting it into a new story, simply use the Place and Import commands. Begin by making sure you have installed the Story Importer filter. To have PageMaker display a list of installed filters, press ⌘ while choosing About PageMaker from the Apple menu. You can install the Story Importer filter with the Aldus Installer program.

Next, close the publication that contains the stories you want to thread, and create a new publication. Choose Place from the File menu, select the old publication, and click OK. PageMaker displays a list of all the stories in the old publication. From the list select the stories you want to thread by shift-clicking each one and then clicking OK (see "One Imported Story"). After placing the threaded story, close the new publication. Open the old publication again and choose Edit Story from the Edit menu. Then choose Import from the Story menu, double-click the new publication, select the threaded story, and place it. A few of the formerly separate stories may be out of order, but you can easily cut and paste them into place.

PageMaker's Place and Import commands are somewhat interchangeable in this process. For example, you could use the Import command (instead of the Place command) to thread the stories in the new publication and the Place command (instead of Import) to place the threaded story into the old publication.

Leo D. Bores
Scottsdale, Arizona

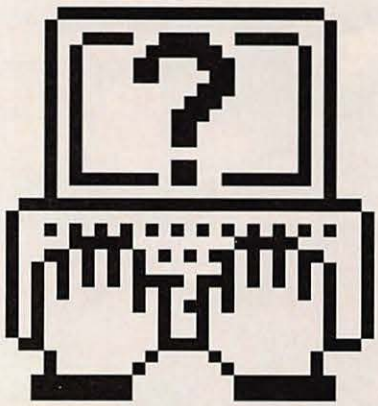
The Excel Five

TIP: Here are five useful tips for Excel.

1. Instead of holding down the ⌘ key while clicking or dragging—the standard (but awkward) method for

(continues)

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selecting multiple discontinuous cells—simply press shift-F8 to put Excel in the add mode, so that clicking or dragging anywhere adds to the selection. Pressing F8 puts you in Extend mode, which you otherwise get by shift-clicking. Aren't you glad you spent the extra money to get an extended keyboard?

[You can accomplish the same thing in any spreadsheet program with any keyboard by using the Sticky Keys feature built into the Macintosh system software, which I described in last month's column.—L.P.]

2. To quickly make one column the same width as another: Select any cell in the column that has the correct width, choose Column Width from the Format menu, and click OK. Now select any cell in the column whose width you want to adjust, and choose Repeat Column Width from the Edit menu.

3. Accountants, are you used to calculators that automatically enter a fixed decimal before the last two digits? Simply choose Workspace from the Options menu, turn on the Fixed Decimal option, and click OK. If you want a different number of places after the decimal point, enter the number as the Places option before clicking OK.

4. Don't you wish the enter key would move the cursor down or to the right, to the next cell in which you want to enter data? Simply select the range of cells whose values you want to enter. The enter key moves you from left to right and top to bottom in the selected cells.

[Pressing return also moves you through a selection. Even better, pressing return or enter moves you through a selection of multiple discontinuous cells in the order in which you previously select them. You can make your discontinuous selection, name it using Excel 3.0's Create Names command (it's the Define Name command in Excel 2.2), and later reselect it by using the Goto command.—L.P.]

5. If you've experienced the joys of the Fill Down and Fill Right commands, double your fun by pressing the shift key before pulling down the Edit menu. These commands then become Fill Left and Fill Up, and the Copy command becomes Copy Picture.

Tod E. Gentille
Redondo Beach, California



WINDOW TRIM To get rid of the gray border that appears around a picture in Photoshop after you zoom out with the magnifying glass, press ⌘-R twice.

Photoshop Window Shrinking

TIP: When I have multiple windows open in Adobe Photoshop, I am always short on screen space and so I'm constantly zooming in and out with the magnifying-glass tool. When I zoom out, the picture gets smaller but the window doesn't, resulting in wasted screen space (see "Window Trim"). To automatically shrink the window to the exact size of the picture I press ⌘-R (which shows and hides the rulers).

Jeffry Gugick
Oswego, New York

. . . . . .

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Lon Poole answers readers' questions and selects their tips for this monthly column. His two most recent books are Amazing Mac Facts *(Microsoft Press, 1991), a collection of the best published tips; and* Macworld Guide to System 7 *(IDG Books Worldwide, 1991).*



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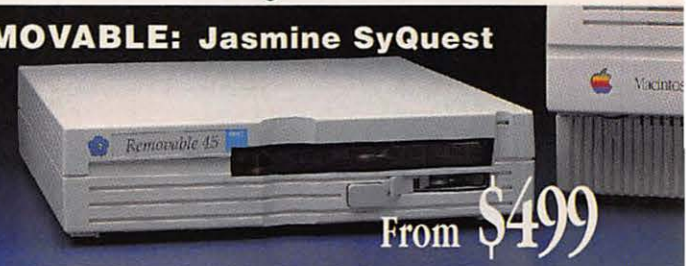
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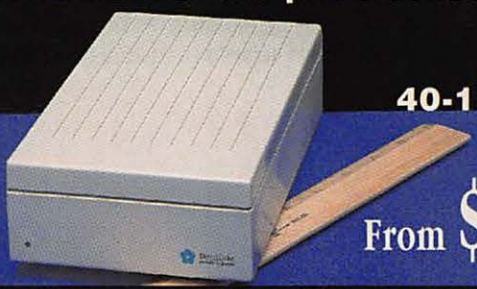
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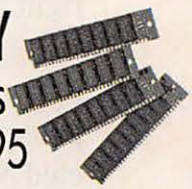
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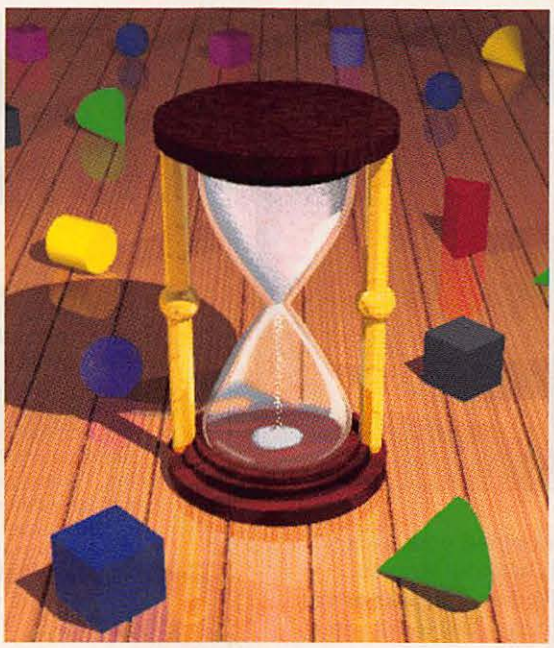
Getting Started with 3-D Graphics

WORKING IN THE THIRD DIMENSION CAN BE REWARDING—IF YOU'RE READY FOR A CHALLENGE

BY JIM HEID

Mac graphics programs are taking on a new dimension—the third dimension. Painting and drawing programs mimic canvases or drafting tables, but a growing number of programs mimic the real world, where objects have height, width, depth, shadows, textures, and perspective—and where those characteristics appear to change as you move around. Many 3-D programs also provide animation features that enable you to make objects move.

Architects can use three-dimensional programs to create animated *walk-throughs* that allow clients to "tour" a building before it exists. Engineers and industrial designers can create realistic renditions of space stations, cars, lampshades—you name it. Package designers can create 3-D mock-ups of packaging and wrap text and images around labels. Graphic designers can create special text effects, such as glittering logos that appear to be cast in chrome. Film and television studios can experiment with different set designs and camera angles without having to construct the real thing. Artists can create images that would be difficult or impossible to produce with programs such as Adobe Illustrator or Aldus FreeHand. And graphics buffs can experiment with creating the kinds of photo-realistic images that make 3-D programs so enticing.



SCOTT BALDWIN

But a reality check is in order. Three-dimensional graphics programs are among the most complex programs you'll find on a personal computer; to use them you'll need to come to terms with a bevy of brain-bending technical and geometric concepts. Forget trying to learn a 3-D program without opening the manual, even if you've already mastered a two-dimensional program. You'll need every tutorial a program's manual provides, plus hours of practice—just to master the basics.

You may need hours of patience, too. It isn't unusual to wait an hour or more for a 3-D program to create a complex photo-realistic scene. You could almost raise a family in the time required to create a 3-D animation with hundreds of images. And although a few 3-D programs run on a Mac Plus, SE, or Classic, most require a Mac II–class machine, and a IIfx is by no means overkill. For best results, throw in a memory upgrade to at least 5MB, a high-capacity hard drive, a large-screen monitor, and a 24-bit video card with a graphics accelerator.

But cost is relative. Many 3-D programs have features that were found only on six-figure workstations not long ago. For businesses that can't

(continues)

afford such hardware—or that don't want to waste their workstations on small jobs—waiting for a Mac 3-D program to generate a complex image is a small price to pay. The third dimension can be a fascinating and rewarding place—if you approach it with the proper perspective (no pun intended). As you'll see, that involves understanding the concepts behind 3-D graphics and then choosing a program that can handle the types of images you want to create.

The Building Blocks of 3-D

The best way to understand the process of creating a 3-D image is to imagine that you're an architect building a house model that will be photographed for publication. Your first step is to cut pieces of balsa wood or cardboard into the appropriate shapes to represent the roof, windows, chimney, doors, and other components of the house. You glue them together, and then paint the model to make it look more realistic—shingles on the roof, bricks on the chimney, and wood grain on the siding. Finally, you have a photographer illuminate the completed model and then photograph it using a variety of camera angles and lenses.

The steps are similar with a 3-D graphics program, only they take place within the Mac. First you use the mouse (or an alternative pointing device such as a graphics tablet; see last November's "Getting Started with Input Devices") to draw shapes that correspond to the house's components. Next you drag the shapes until they're correctly positioned in relation to one another, and then you group them to *lock* them together. This draw-and-glue phase is called *modeling*.

When you're finished modeling, you have a 3-D version of a house—but every component has the same bland, smooth surface. That's when you begin *rendering*, the process of electronically painting a model. In the rendering phase, you specify textures and colors for the surfaces in the model, assigning a shingle pattern to the roof, brick to the chimney, wood grain to the siding, and so on.

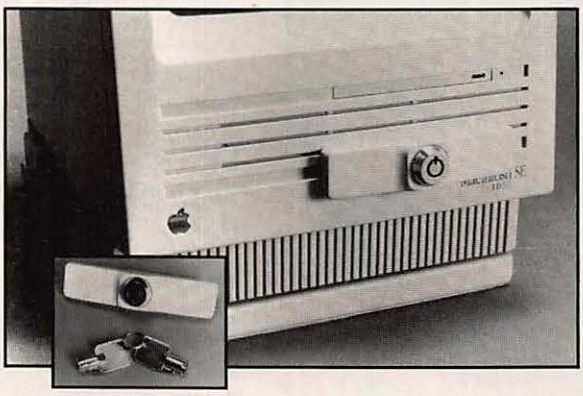
Creating the final image—the equivalent of photographing a model—is called *scene description*. In this phase, you specify the number and position of the lights illuminating the model, along with their characteristics—for example, whether they're bright or dim and whether they're spotlights or floodlights. You can also specify the color of the light itself, choosing, say, a yellowish hue to simulate late-afternoon sunlight.

In the scene-description phase you also play the role of photographer, choosing the camera angles and lenses that best capture your model. It helps to know a bit about photography: a 3-D program's electronic lens acts much like a real camera's—a wide-angle lens distorts somewhat and provides better depth of field, for instance, while a telephoto lens reduces the degree of perspective visible in the final image.

The modeling, rendering, and scene-description phases don't necessarily occur in the order in which I've described them. You might, for example, adjust lighting and camera

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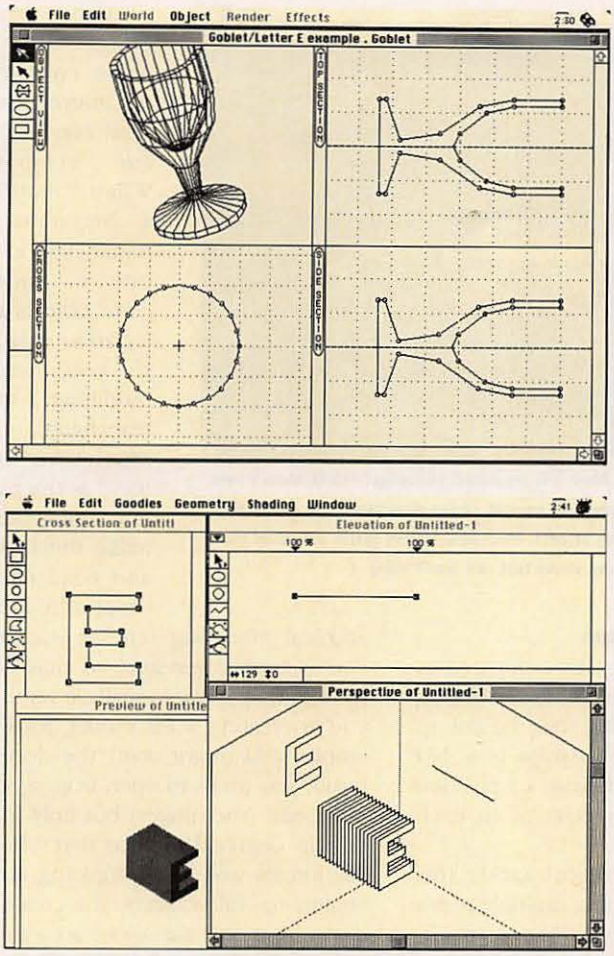
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EXTRUSION VERSUS LATHING At top, Swivel 3D Professional's lathing feature is used to create a wine goblet. At bottom, Ray Dream Designer's extrusion feature is used to create a 3-D letter.

angles before assigning textures and performing other rendering tasks, or create light sources and change lenses before bringing objects into a scene. What's more, not all 3-D products can handle all three phases. Some programs are modeling specialists and have minimal rendering and scene-description skills, while others add rendering and scene description to models created with a different company's modeler. Still other products handle all three tasks, using either one program or separate modeling and rendering programs that you switch between as you work. More about each approach later.

Model Making

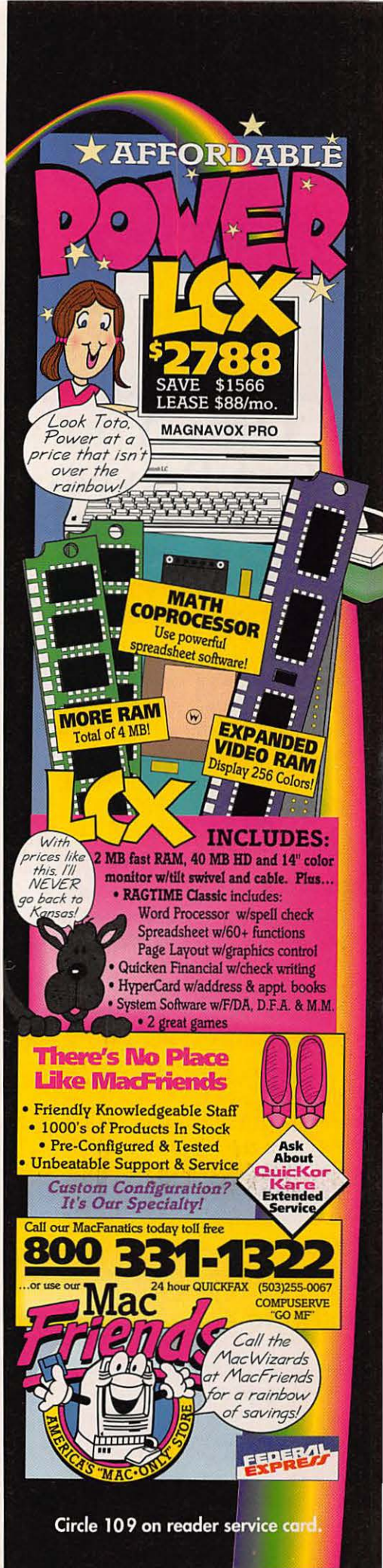
Modeling out of balsa wood means using a knife to cut out shapes that you attach to each other. Modeling with a 3-D program isn't as straightforward. You create basic shapes not by cutting them out, but by drawing them with the mouse or the stylus. Trickier still, you assemble those shapes not in the three-dimensional space in front of you, but in the simulated 3-D world that the program projects on the Mac's screen.

Different modelers provide different drawing features, but in general, creating a model's basic shapes often begins with drawing *primitives*—circles, rectangles, polygons, or curves. Like drawing and painting programs, modeling programs provide on-screen palettes for various drawing tools. But drawing a primitive is only a starting point. To create a 3-D object you need to use either the program's *lathe* or *extrude* features (see "Extrusion versus Lathing").

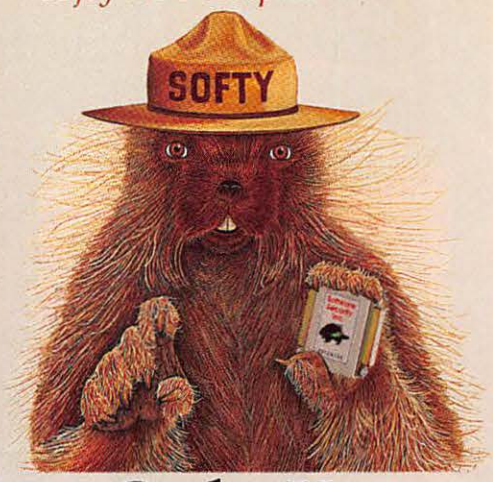
A modeler's lathe features enable you to create objects with *radial symmetry*—goblets, bowls, baseball bats, doughnuts, doorknobs, the letter *o*. When you're using a lathe, or *sweep*, feature, you generally draw half the object—a *profile*—and the program rotates your drawing around an axis to create the 3-D object.

Extrusion creates a 3-D object by copying the primitive, moving the copy, and then adding edges to create a surface that connects the copy to the original. The result is a shape with a complex cross section and plain sides—as if the shape were cut out with a jigsaw or cookie cutter.

(continues)



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FROM MANY ANGLES Most 3-D programs, including Infini-D, shown here, allow you to view a scene from several angles simultaneously, simplifying the process of positioning objects. Most also let you resize individual views to fill the screen and close views that you aren't using.

Composing the Scene

Creating shapes is easy compared to assembling them into complex objects and images. The fact that the link to the program's 3-D space is a 2-D screen makes it difficult to position shapes accurately relative to each other.

Most 3-D programs tackle this problem by providing multiple *views* of a scene (see "From Many Angles"). Modifications you make in one view are reflected in the others, thus providing the feedback needed to position objects accurately. With programs that show just one view at a time, you may need to spend some time navigating around your model to verify that objects are positioned correctly.

To allow you to move or rotate a model or change your vantage point (usually called the *camera*) without waiting for the image to be redrawn, most 3-D programs use a *wire-frame* display, which shows only the objects' edges. Many programs can also display more detailed versions, but must sacrifice speed to do it.

When you're creating a complex object out of separate shapes, you must tell the program that the shapes are related. After all, if you rotate a car body to view it from a number of angles, you want its tires to go along for the ride. Programs such as Silicon Beach Software's Super 3D and Dynaware's DynaPerspective provide a Group command that combines the objects you select into one.

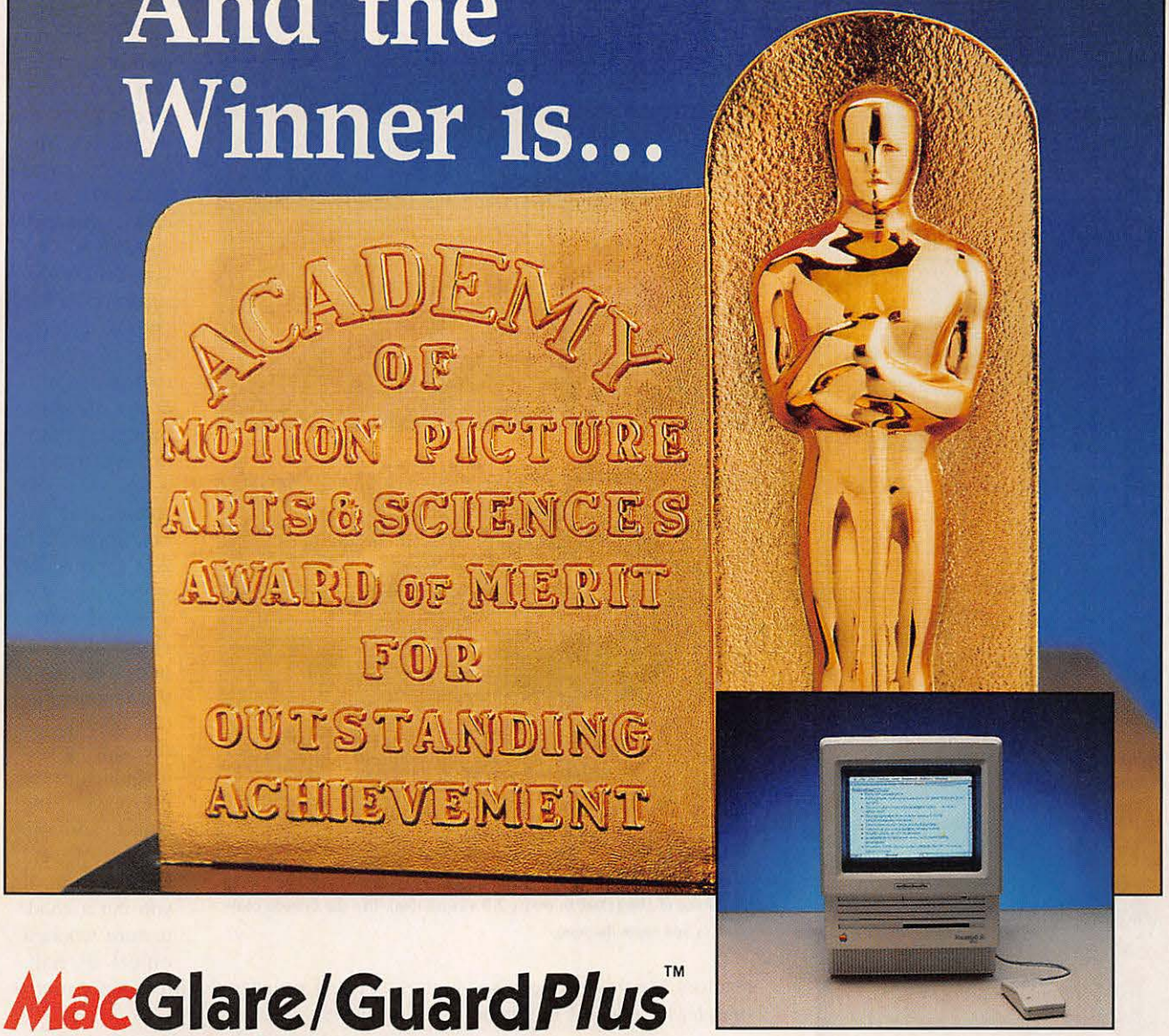
Other programs use a more complex but more powerful *hierarchical* scheme. When creating a hierarchical model, you lock one or more *child* objects to a *parent* object. If you were modeling a human figure, you might use the torso as the parent object and make the limbs and head child objects. A hierarchical modeling scheme enables you to apply *constraints* to child objects so they move in realistic ways. If you're creating a car model, for example, you might want the doors, hood, and trunk to open from a certain point (the hinges) but only to a certain degree (because that's how car hinges work). By applying constraints to child objects, you create a *dynamic* model that more accurately represents the real thing.

Some programs provide a *library* feature that lets you store and recall objects for reuse. Some programs also include libraries of commonly used shapes and objects. DynaPerspective, for example, includes architecture and interior-design-oriented shapes such as doors, plumbing fixtures, and office equipment. Pixar's Showplace comes with a library of 3-D text characters, as does Paracomp's SwivelArt collection of 3-D clip art images.

Speaking of text, it's worth noting that you can't simply click on a text tool and start typing 3-D text in your favorite font. Some modelers can create an object out of text stored in a PICT or Adobe Illustrator file by tracing the edges of the characters. StrataVision 3D's text tool uses similar techniques to generate objects from typed-in text. With either approach you can add depth to the text by extruding the resulting outline (see "Text with Depth"). MacroMind Three-D is supposed to provide a 3-D

(continues)

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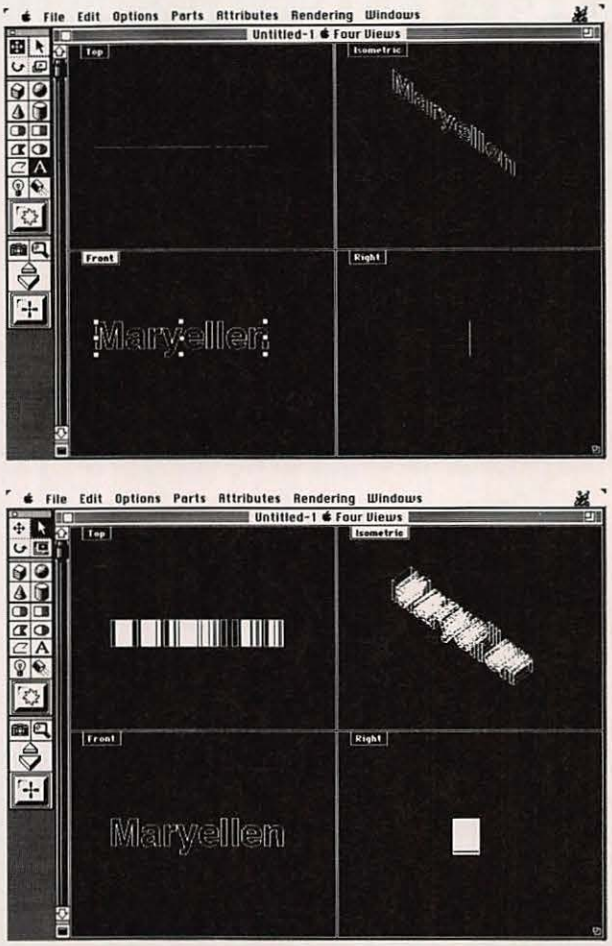
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TEXT WITH DEPTH StrataVision 3D simplifies creating 3-D text by tracing the outline of characters to create 2-D shapes (top). Use the Extrude command to add depth (bottom).

text tool, but this feature wasn't in the prerelease version I examined.

Above and Below the Surface

So when do you see those stunning, photo-realistic results? In time. First you need to apply textures and other details to the surfaces of your model. *Texture-mapping* features, found in most midrange and high-end programs, let you apply such textures as wood grain or brick to a surface—much like applying self-adhesive patterned paper to a balsa model. Any image saved in the proper format can be used as a texture map. For example, a package designer might make a texture map from text saved as a PICT file and then use it for a label that wraps around a 3-D bottle.

Because a texture map is a flat image resting on an object's surface, it doesn't allow for realistic rendering of 3-D materials such as wood or marble, whose texture patterns vary within different parts of the object. The answer: *solid textures,* also called *shaders,* supported by Ray Dream Designer (from Ray Dream), Infini-D (Specular International), and Sculpt 3D (Byte by Byte Corporation), to name a few. A wood shader, for example, isn't a 2-D picture of wood grain; it is a set of mathematical routines describing the characteristics of wood—the spacing and undulations of the veins of the wood, and the colors of seasonal growth. If you cut a solid-texture wooden object in half, you'll actually see the grain pattern inside.

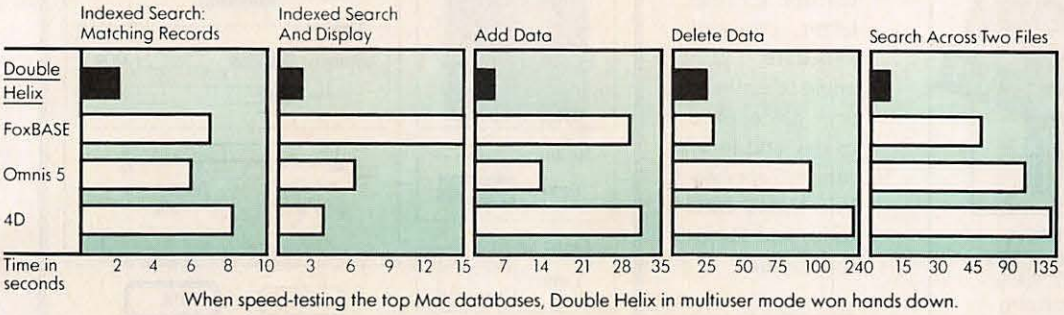
Another characteristic that affects an object's appearance is its roughness. Bowling balls and oranges are spheres, but their vastly different surfaces cause them to reflect light differently. *Bump-mapping* features give surfaces a 3-D roughness that would be grueling to model by hand. Most programs let you adjust the degree of bumpiness, allowing you to render everything from the nubs of an orange peel to the craters of the moon.

Creating a photo-realistic scene also requires specifying an object's *surface properties*—its degree of transparency and the way its surface reflects light and objects around it (see "Light Show"). You might also create and position additional light sources to better illuminate a scene or simulate a certain time of day. *(continues)*

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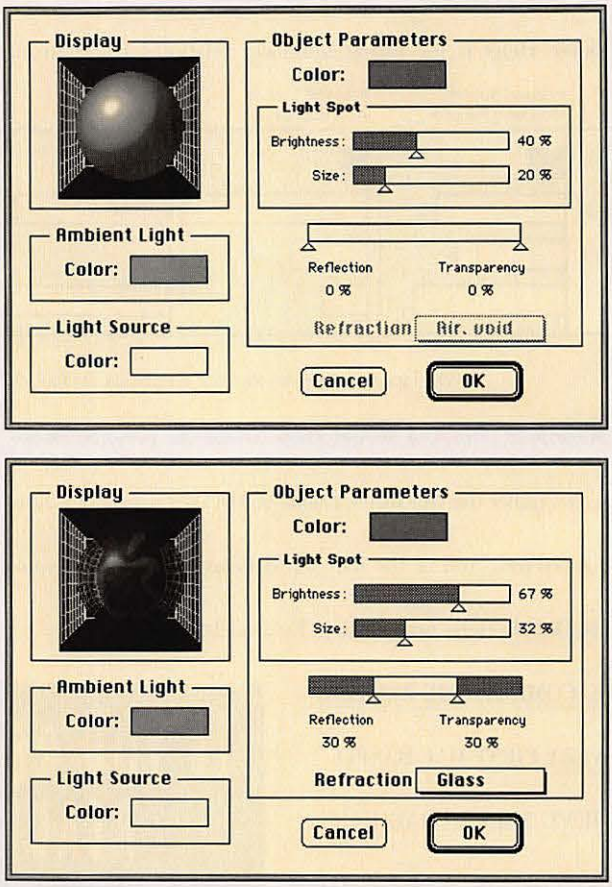


Double Helix

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Alias's UpFront offers a unique feature for the latter: you can simulate the angle of sunlight at a given time of day and location by specifying time, latitude, and longitude values.



LIGHT SHOW Like most 3-D programs, Ray Dream Designer enables you to modify an object's surface properties to simulate various materials. At top, the preview shows the program's preset values of no transparency and no reflection. At bottom, reflection and transparency have been modified. The Light Spot options enable you to change the brightness and size of the highlights that appear on illuminated objects.

Photo-Realism at Last

Now the time has come to let your rendering program earn its keep by slogging through the myriad calculations required to create the final image. The most calculation-intensive rendering technique is *ray tracing*, provided by StrataVision 3D, Infini-D, Sculpt 3D, Ray Dream Designer, and Visual Information Development's soon-to-be-released Presenter Professional. A ray tracer projects an imaginary ray of light from the center of the "camera" into the scene and back, calculating the effects of the scene's light sources as they illuminate surfaces—thus capturing highlights, shadows, and reflections. This process occurs for every screen dot (pixel) that appears in the final image, so the larger the image, the longer the wait.

Faster but less realistic rendering techniques involve the use of *shading modes* (not to be confused with the previously described shaders, which simulate solid textures). "Three Ways to Shade" shows the most common shading modes: *flat*, which provides the fastest rendering but the least amount of surface detail; *Gouraud*, which offers slower rendering with more detail; and *Phong*, which provides the best surface detail but requires the most rendering time.

After you've invoked your program's Render command (or its equivalent), sit back and wait for the results. If you're running MultiFinder or System 7, and if the program can render in the background (most can), you can switch to a different program. But increasing the Mac's work load slows down the renderer, so you might just want to go out for lunch.

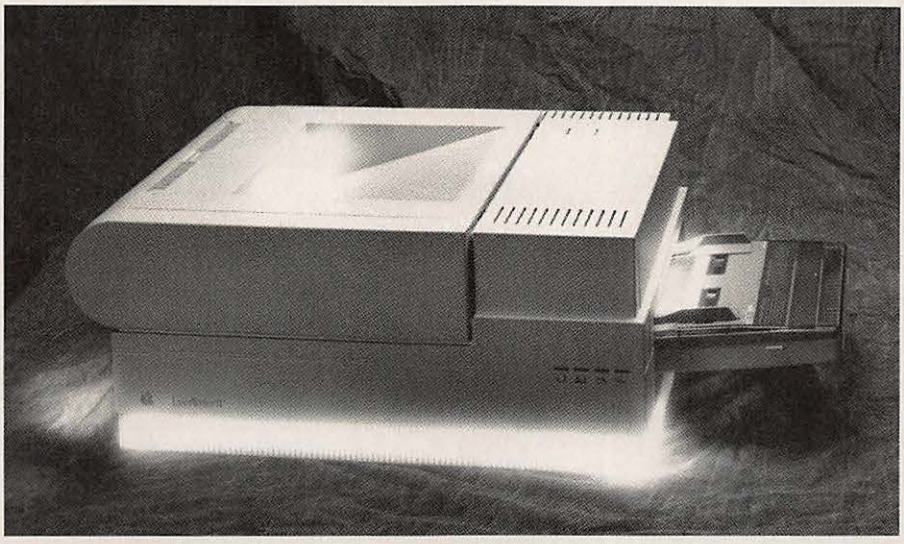
When the renderer completes its chores, you can save the results on disk, generally in PICT, TIFF, or EPS formats. You can also print images, although you need a high-end color printer or a film recorder to do justice to a full-color ray-traced image.

Choosing a 3-D Program

Should you use an all-in-one program such as Infini-D or Sculpt 3D? Or *(continues)*

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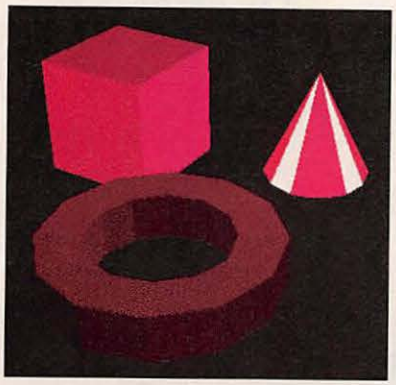
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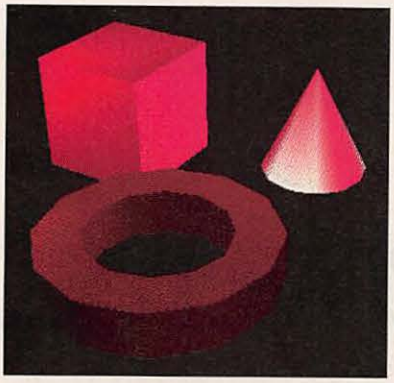
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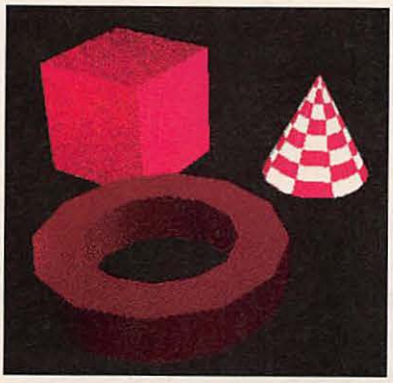
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THREE WAYS TO SHADE The three most common shading techniques are: flat (top), Gouraud (middle), and Phong (bottom). Flat is best for quick rendering; Gouraud renders more slowly and with more surface detail; and Phong provides the most realistic results but requires the most processing time.

should you combine a modeler such as Swivel 3D Professional (Paracomp) with a stand-alone renderer such as MacRenderMan (Pixar)?

One advantage of combining separate programs is that you can tailor your 3-D toolbox to your tastes. But there are drawbacks, too, not the least of which is that you'll probably spend more. A more serious problem is that one firm's renderer might not accurately import another's models. The most common file format for exchanging models is called *DXF*, which was popularized by computer-aided design programs (some of which also provide 3-D modeling features). Many 3-D programs support DXF, but there's no guarantee that each reads or writes DXF files in exactly the same way. If you're considering separate programs, ask the developers if they know of any file-compatibility problems. And remember that switching between different programs isn't as fast or convenient as using an all-in-one program.

Because 3-D programs are so complex, I recommend trying a few before buying one. Most developers offer demo packages that include scaled-down versions of their programs, videotape demonstrations, or both. They're an inexpensive way to sample 3-D.

If you'd like to create 3-D images without grappling with complex modeling concepts, consider Paracomp's SwivelArt collection of 3-D clip art. It includes a scaled-down version of Swivel 3D that you can use to rotate and modify the included artwork. Pixar's soon-to-be-released Showplace will combine elegant scene-description and rendering software with libraries of beautifully designed clip art and texture surfaces. Alas, it requires 8MB of memory; SwivelArt needs just 2MB.

That 3-D graphics programs are difficult to learn is no reflection on their designers. Simulating the real world is not an easy task. But if you can make a 3-D program earn its keep—and if you invest the time required to master it—it will give you new ways of looking at your design jobs. And working with it will give you new appreciation for light, shadows, textures, perspective, and all the other phenomena that contribute to that mental miracle called sight. M

Contributing editor Jim Heid focuses on a different aspect of Mac fundamentals each month. His latest book, Macworld Complete Mac Handbook *(IDG Books Worldwide, 1991), is an updated collection of more than 40* Getting Started *columns.*



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UPDATES

Here's our list of some of the latest versions of Mac software that were announced at the time we went to press. We hope you'll find it useful. The first price is the upgrade cost for registered owners; the second price is the current list price. (Send your update announcements to Updates, Macworld, *501 Second St., San Francisco, CA 94107.)*

DeltaGraph Pro contains 14 additional chart types; has an expandable custom-template library in which the user can save backgrounds, PICT files, and other images; creates a variety of color blends; and produces screen images using RGB or CMYK mode. DeltaPoint, 408/648-4000. $75; contact dealer for list price.

MacInTax version 2.0 contains a forms guide that acts like a back-end interview sheet to help the user determine which tax forms are needed; contains additional forms; and gives tax advice in pop-up windows. Softview, 805/385-5000. $50; $99 new.

QuarkXPress version 3.1 includes three new palettes—Colors, Trap Information, and Style Sheets—and comes with an Application Preferences dialog box. Takes advantage of System 7 capabilities. Quark, 303/934-2211. Contact vendor for update price; $895 new.

Quicken version 3.0 prints checks, and has a built-in electronic bill-payment capability. Tracks spending and savings with automatic reports like Cash Flow, Budget, Itemized Expenses, Tax Summaries, and Net Worth. Intuit, 415/322-0573. Contact vendor for update price; $59.95 new.

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A/UX	2.0	4MB/6.0.5		*
BackFax	1.5.1	1MB/6.0.3		$25
BackMatic	2.0	1MB/4.2		*
Bill-It	**2.6**	**1MB/6.0.3**		*
Bitstream Typeface Library	2.0	1MB/6.0		*
Business Sense ★	1.4.1	1MB/6.0		*
Business Session ★	3.2	512K/3.2		Free
CA-Cricket Presents	2.0.1	1MB/6.0		*
CanOpener	1.1	512K/3.0		Free
Canvas	2.1	1MB/6.0		*
Capture	4.0	1MB/6.0		$30
Carbon Copy Mac ★	**1.0.4**	**1MB/6.0.5**		*
Claris CAD	2.0.2	2MB/6.0		$79
Color MacCheese	**2.07**	**1MB/6.0.5**		**$15**
CompuServe Navigator	3.0.4	512K/4.1	12/90	*
CompuServe Information Manager	1.03	1MB/4.1	12/90	*
ConcertWare	5.1	512KE/4.2		$35
Correct Grammar	2.0	1MB/4.2	9/90	$29.95
DataMerge	2.0.3	512K/3.2		Free
DataPrism	1.1	1MB/6.0		Free
dBase Mac ★	1.01	1MB/4.1		Free
DeltaGraph	**2.0**	**2MB/6.0.5**		**$50**
DeltaGraph Pro		**2MB/6.0.5**		**$75**
DeluxeMusic Construction Set	2.5	512K/6.0.2		*
D.E.S. Document Exchange System	**4.1**	**1MB/6.0**		*
DesignStudio	2.0	1MB/6.0		*
DeskPaint ★	3.03	1MB/4.2		Free
Developer Stack	3.0	1MB/6.0		$15
Digital Darkroom	2.0	1MB/6.0		*
DiskDoubler	3.1	1MB/6.0.2	12/90	Free
DiskExpress II ★	2.07	1MB/6.0	11/90	*
DiskFit and Network DiskFit	2.0	1MB/6.0	7/91	*
DiskTop	4.01	1MB/6.0		*
Display AdBuilder	1.1	1MB/6.0.3		*
Dollars & Sense	5.0	512KE/3.2		$34.95
Double Helix	3.5	1MB/6.0		$99
Dreams	1.1	1MB/6.0.2		*
DynaPerspective	2.04	2MB/6.0.4		Free
DynoDex ★	2.0	1MB/6.0		$25
EarthQuest	2.0	1MB/6.0	4/91	*
Easy Color Paint	2.0	1MB/6.0.2	9/90	*
Empower II ★	4.01	1MB/4.2		*
Family Heritage File	2.7.3	512K/4.2		*
Fastback II	2.1	512KE/4.1		$30
Fast Forms	2.0	1MB/6.0	11/90	$25
FastLabel	2.02	1MB/6.0		*
FastTrack	1.5	512KE/5.5		$20
FaxGate	1.12	1MB/6.0		Free
FileMaker Pro ★	1.02	1MB/4.2	2/91	Free
Filevision V	1.1	1MB/6.0.2		*
FilmMaker	2.5	5MB/6.0.3	3/91	*
Finale	2.6	1MB/6.0.2		Free
Findswell	2.01	512KE/3.2		*
Fontographer	3.2	1MB/4.2		*
FontShare	2.2	1MB/6.0		Free
FoxBase+/Mac ★	2.01	1MB/6.0		Free
FrameMaker	3.0	1MB/6.0	1/91	*
Freedom of Press	3.0.1	2MB/6.0.3		Free
FreeFlow	3.0	1MB/6.0.3		Free
Full Impact ★	2.0	1MB/6.0		$50
FullWrite Professional	1.5	2MB/6.0.2		*
Generic CADD	1.1	1MB/6.0.5		*
GeoQuery	2.0	1MB/6.0	10/90	*
Gofer	2.0	1MB/4.1		$25
Grammatik Mac	2.0	1MB/5.0	9/90	$29
Great Gantt	1.4	1MB/6.0	12/90	*
Great Plains Accounting Series	5.35	1MB/6.0		*
HandOff II	2.1.3	1MB/6.0		Free
Help DA	3.1.1	1MB/6.0		Free
Hybase ★	**2.0**	**1MB/6.0**		*
HyperAnimator ★	1.5	1MB/6.0.3		$29.95
HyperCard	2.0	1MB/6.0.3		$49
HyperDA	2.0	512K/3.2		*
HyperWindows ★	1.2	1MB/6.0.2		$20
Icon-It	2.1	1MB/6.0.2	9/90	*
if:X Forms Designer	1.1	1MB/6.0	9/90	Free
ImageStudio	1.5	1MB/6.0		$99
InfoLogic Envelope ★	1.1c	512KE/4.0		$5
Insight Expert Accounts Payable	2.1.1	1MB/6.0		*
Insight Expert Accounts Receivable	2.2	1MB/6.0.2		*
Insight Expert General Ledger	2.2	1MB/4.2		$99

(continues)

Bold *= first time the product is being listed.*

★ = minor update.

Req. *= min. RAM and system software required.*

Rev. *= last time (in past year) reviewed this or an earlier version.*

Price *= cost for update to registered owners.*

** = contact your dealer for update policy.*

PRODUCT UPDATES

Product	V.	Req.	Rev.	Price
Inspiration	3.0	1MB/4.2	11/90	*
Instant-Expert Plus ★	2.0	1MB/5.0		Free
Interactive Physics	1.2	1MB/6.0.2		$29.95
InTouch	1.1	1MB/6.0.5	5/91	Free
JetLink Express ★	2.1	1MB/6.0		*
KaleidaGraph	**2.1**	**2MB/6.0.5**		**$20**
KiwiEnvelopes ★	3.1	512KE/4.1		*
LabView ★	**2.1.1**	**4MB/6.0.5**		*
LanguageSystems Fortran ★	2.1	2MB/6.0.4		Free
LapLink Mac Plus III	3.0	512K/2.0		*
LaserPaint Color II ★	1.02	1MB/6.0.3		Free
LetraStudio	1.5	2MB/6.0		$45
Light Checkbook Accounting	2.0	1MB/6.0.3		*
Lightspeed Color Layout System	2.5	1MB/6.0.5		*
LXR.Test ★	**4.1**	**1MB/6.0**		**Free**
MacAnalyst	2.0	2MB/6.0		$125
MacArchitrion	4.0	2MB/6.0.3		Free
MacClassAds	4.0	1MB/6.0		*
MacDraft	2.1	1MB/6.0.2	12/90	*
MacDraw II	1.1	1MB/6.0		*
MacEnvelope	5.0	512KE/3.2		$25
MacEnvelope Plus	2.0	512KE/3.2		$50
MacInTax ★	**2.0**	**1MB/6.0.5**		**$50**
MacFlow ★	3.1.5	1MB/6.0.3		Free
MacFortran for MPW	1.1	2MB/6.0.2		Free
MacLinkPlus/PC	5.0	1MB/6.0.2		*
MacLinkPlus/Wang VS	4.0	512KE/3.2		$45
MacMoney	3.5	512KE/4.0		$12
MacPhonebook	3.0	1MB/6.0	4/91	*
MacProject II	2.1	1MB/6.0		Free
MacRecorder	2.03	512K/3.2		*
MacroMind Director	2.0	2MB/6.0.2	10/90	$100
MacSafe II		512KE/4.2	10/90	*
MacSchedule	2.5	1MB/6.0		$30
MacTerminal	3.0	512K/3.2		$65
MacTools Deluxe	**1.1**	**1MB/6.0**		*
MacWrite II	1.1	1MB/6.0		Free
Managing Your Money	4.0	1MB/6.0.3		*
MapGraphX	2.0	4MB/6.0.3	4/91	Free
MarcoPolo	1.1	1MB/6.0		Free
MarketMaster	II+	1MB/6.0.3		$25
MarkUp	**1.03**	**1MB/6.0**		**Free**
MasterFinder	**1.1**	**1MB/6.0.5**		*
MathCAD ★	2.06	1MB/6.0.2		Free
Mathematica	2.0	1MB/6.0		*
MathType	2.1.1	512K/6.0.2		*
MathWriter	**2.0**	**2MB/6.0.5**		*
Matlab	1.2	1MB/3.0		*
MaxPage ★	1.2	512K/3.2		Free
McCPrint	2.1	512K/4.2		$25
Metamorphosis Professional		**1MB/6.0.3**		*
MicroPhone II	3.0	512K/4.2		*
Microsoft Excel	3.0	1MB/6.0.2		*
Microsoft File	2.0	512K/3.2		*
Microsoft Mail	3.0	1MB/6.0.2	8/91	*
Microsoft PowerPoint	2.01	1MB/6.0		Free
Microsoft Word	4.0	512KE/3.2		*
Microsoft Works	2.0	512K/6.0		*
MindLink	2.0	1MB/6.0		*
MindWrite ★	2.1	512KE/4.2		*
MiniCad +	3.1	1MB/6.0	7/91	*
MockPackage Plus Utilities	4.4	512KE/3.2		$15
ModelShop II		1MB/6.0.2		$150
More ★	3	1MB/4.1	12/90	*
Multi-Ad Creator	2.0	2MB/6.0.3		*

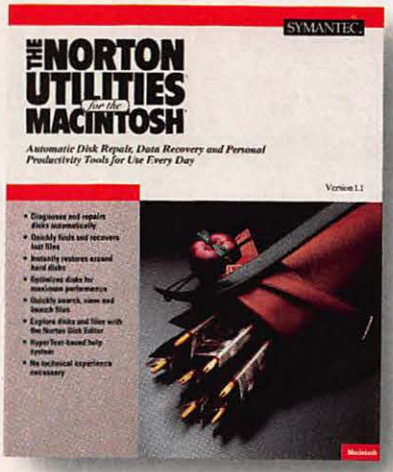
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—MacUser Magazine, 3/91

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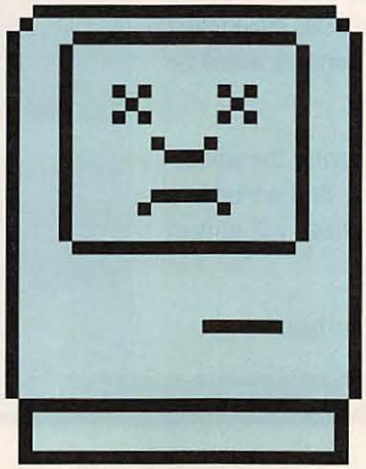
Product	V.	Req.	Rev.	Price
MultiClip	2.0	512K/6.0.2		*
MultiLedger ★	1.1	512K/3.2		$75
MusicProse ★	2.1	1MB/6.0		Free
Music Publisher	2.5.2	1MB/6.0		$15
MyDiskLabeler III	3.0.4	1MB/6.0		*
M.Y.O.B.	2.0	1MB/6.0		*
MyTimeManager	3.0	1MB/6.0		*
NetMinder Ethernet	1.2	2MB/6.0		*
Network Bundle for the Mac	3.0	512K/3.2		*
Nisus	3.05	1MB/6.0.2	2/91	*
Now Utilities	2.0.3	1MB/6.0.2	7/91	*
NuBase Mac ★	**1.3**	**1MB/4.1**		**Free**
OmniPage ★	2.1	1MB/6.0.2		Free
Omnis 3 Plus/Express	3.3	512KE/3.2		*
OnCue	**1.3**	**512K/4.2**		**$10**
On Location	**1.02**	**1MB/6.0.5**		**Free**
On Schedule	2.0	1MB/3.0		*
PacerLink	5.3	512K/5.0		*
Panorama	1.5	1MB/4.2		$29.95
Phonenet Liaison	3.0	1MB/4.2		$75
PhotoMac	1.5	2MB/6.0.3		$75
The Phrase Thesaurus	2.0	1MB/6.0		Free
PICT Detective	2.0	512KE/6.0		$20
PixelPaint	2.1	2MB/4.1		*
PixelPaint Pro	2.0	3MB/6.0.3		$125
Plains & Simple ★	1.06	1MB/3.2		*
PowerDraw	3.0	1MB/6.0		*
PowerStation ★	2.5.5	512K/4.1		*
Practica Musica	2.2	512K/3.2		*
Pro-Cite ★	1.3.4	512K/4.1		*
Prodigy	**3.1**	**1MB/6.0**		**Free**
Professional Composer	2.3	1MB/6.0.3		Free
The Programmer's Online Companion	2.1	1MB/6.0.5		$10
Prograph	2.0	2MB/6.0		*
PropsForms	2.0	1MB/6.0.3		Free
Prototyper ★	3.0	1MB/4.1		$99
Publish It	1.2	512KE/5.0		*
Publish It Easy	2.0	1MB/6.0	9/90	*
Publish or Perish	6.0	512K/4.2		$12.95
Pyro	4.0	512K/4.1		$15
QuarkXPress	3.1	2MB/6.0.5	11/90	*
Quicken	3.0	1MB/6.0.5		*
QuicKeys²	2.01	1MB/6.0.2	1/91	$49.95
QuickLetter	1.1.4	1MB/6.0		*
QuickLock	2.0	512KE/3.2	10/90	Free
QuickMail	2.5	512KE/3.2		*
QuickShare	2.0	512KE/3.2		$75
QuickShot ★	2.1	1MB/4.2		$5
RagTime 3	3.1	2MB/6.0		$150
Read-It OCR Personal	2.1	1MB/6.0.3		$29
Read-It OCR Professional	3.0	2MB/6.0.3		*
ReadySetGo	4.5	1MB/6.0		*
Retrospect Remote	**1.3**	**1MB/6.0**		*
SAM	3.0	1MB/6.0	2/91	$29
ScheduleMaker ★	3.01	1MB/6.0		$25
Smart Alarms	3.1	1MB/6.0.2	12/90	$25
Smart Alarms & Multi-User Appointment Diaries	3.06	1MB/6.0.2	12/90	*
SmartForm Designer	1.1	1MB/6.0		Free
Snap ★	3.1.3	1MB/3.0		*
SnapJot	3.0	512K/4.1		*
SoftPC ★	1.3	2MB/6.0		*
Sound Designer II	2.01	2MB/6.0.5		*
Spelling Coach Professional	3.1	512KE/4.2		*
Spellswell ★	2.2	512K/3.2		$20
Spinnaker Plus	2.0	2MB/6.0		$45

(continues)

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ensures safety against data loss when it optimizes your hard disk for maximum efficiency. And should you ever inadvertently erase your hard disk, Format Recover restores it for you with just a few clicks of your mouse.

We've also included KeyFinder and Fast Find—two remarkable improvements to your Macintosh's Key Caps and Find File desk accessories—as well as Directory Assistance, a time-saving shortcut to opening and creating folders.



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EDITORS' CHOICE MacWEEK 1991

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Circle 154 on reader service card.

PRODUCT UPDATES

Product	V.	Req.	Rev.	Price
Status Mac	2.0	1MB/6.0		*
Stepping Out II	2.02	1MB/4.1		Free
StickyBusiness ★	1.4	512KE/6.0.3		*
StrataVision 3d	2.0	2MB/6.0.3		$99
Studio/8	**2.0**	**2MB/6.0.5**		**$30**
Studio/32	**1.1**	**5MB/6.0.5**		**Free**
StuffIt Classic	1.6	1MB/6.0		*
StuffIt Deluxe	2.0	1MB/6.0	7/91	Free
Suitcase II	1.2.6	512KE/4.1		$25
SUM	2.0	1MB/6.0		$39.95
Super 3D	2.1	512KE/6.0.2		Free
SuperANOVA	1.1	1MB/6.0.2		Free
SuperGlue II with GlueNotes	2.1	1MB/6.0		*
SuperLaserSpool	2.0.2	1MB/6.0		$30
SuperPaint	2.0	1MB/6.0.2		$50
SuperSpool	5.0	512K/4.1		$30
Swivel 3D	**1.2**	**1MB/6.0.5**		**$49.**
Swivel 3D Pro		**4MB/6.0.5**		**$150**
SYSTAT	5.1	2MB/6.0		*
TaxView 1040 Professional	**2.12**	**2MB/6.0.5**		**$250**
Tempo II Plus	2.0.1	1MB/4.2		$39.95
TextPert ★	3.01	1MB/6.0		Free
TextScan	3.08	1MB/6.0		$69.95
Theorist	1.1	1MB/6.0		*
Think C	4.0	1MB/5.0		*
Think Pascal	3.0	1MB/5.0	11/90	$69
ThunderWorks	1.0.5	1MB/6.0.2		*
Timbuktu	4.0	1MB/4.1	10/90	*
Timbuktu/Remote	2.0	1MB/4.1	2/91	*
Timeslips III	2.0	1MB/6.0.2		*
TypeReunion	1.01	1MB/6.0		Free
TypeStyler	1.5	1MB/4.1		*
UNITize ★	1.3.5	512KE/3.2		$20
VersaCAD/ Macintosh Edition	3.0	1MB/6.0		$395
VersaTerm	**4.5**	**1MB/6.0.3**		**$20**
Virex	3.1	1MB/4.2		$15
Virtual 2.0 for 030	2.04	1MB/4.2		Free
Virtual 2.0 for Mac II	2.04	1MB/4.2		Free
Virtual 2.0 for Mac Plus	2.04	1MB/4.2		Free
Wall Street Investor	3.0	1MB/5.0		$150
White Knight II	11.12	1MB/6.0.2		*
WillMaker	4.0	512KE/4.2	3/91	$18.50
Wingz ★	1.1	1MB/6.0		Free
Word Finder	2.0	512K/3.2		*
WordPerfect for the Macintosh	2.0	1MB/6.0.5	7/91	$89
WorksPlus Spell	2.0	1MB/6.0.3		$35
WriteNow	2.2	512K/4.2	9/90	$49

To have products listed in this section, send upgraded software, an outline of changes since the previous release (indicate if it's a maintenance upgrade), upgrade price, minimum RAM and system software, suggested retail price, company name, mailing address, and phone number to *Updates, Macworld,* 501 Second St., San Francisco, CA 94107.

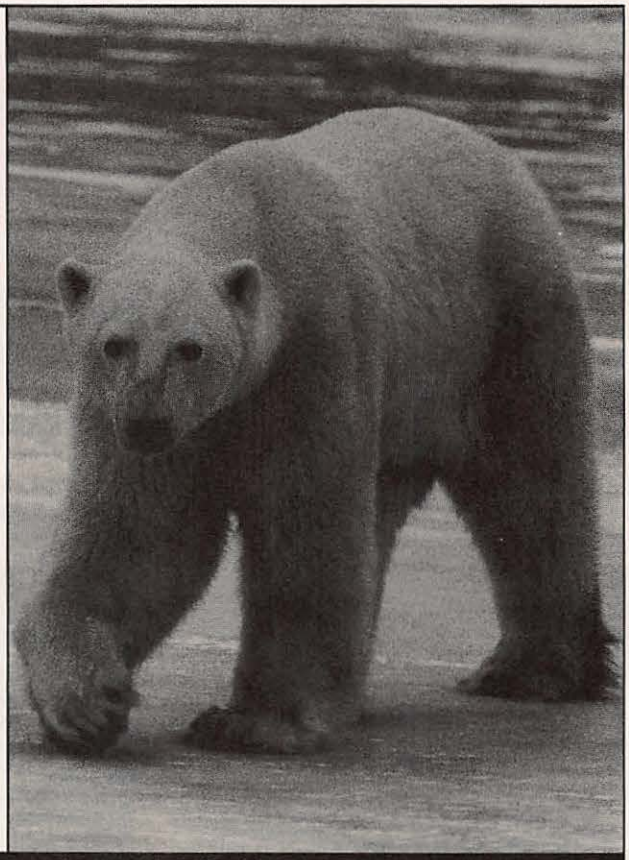
No Wild, No Wildlife.

Polar bears, musk-ox, grizzlies, caribou — more animals than you'd find in Yellowstone — can be found on the magnificent coastal plain of the Arctic Refuge in Alaska. Unfortunately, this portion of our last arctic wilderness has caught the eye of the oil industry. Right now Congress is considering proposals that would allow the oil companies to drill there, even though reports indicate there's less than a one-in-five chance oil would be found.

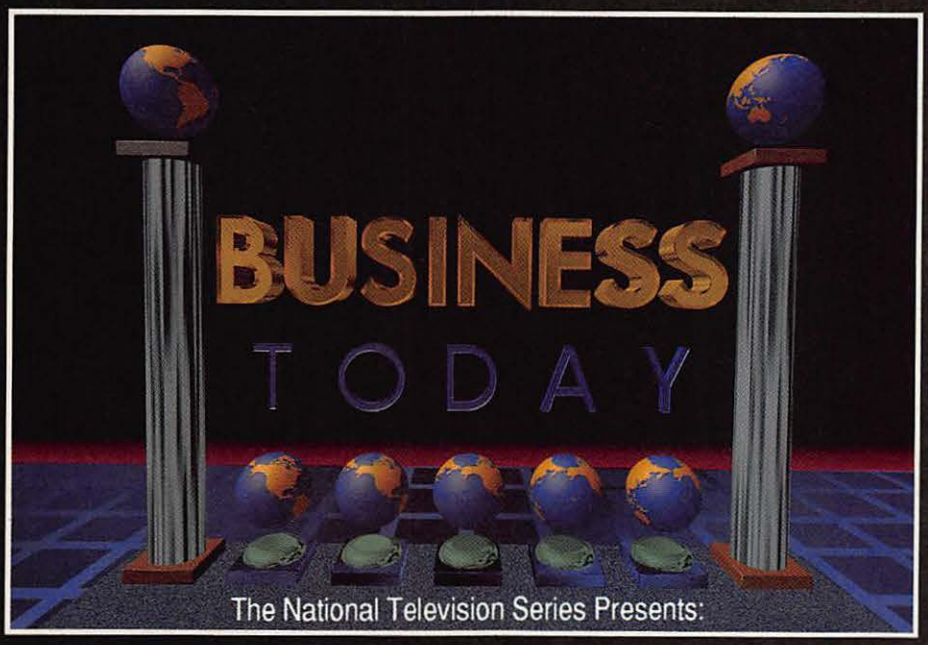
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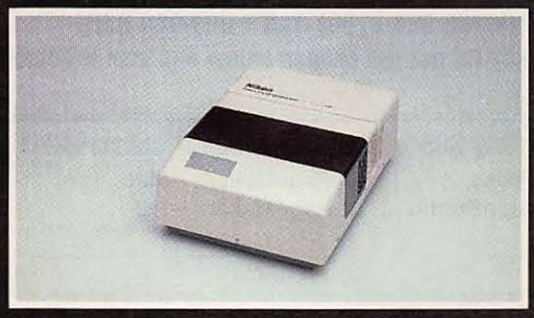
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Color Pivot by Radius–the first color full-page display for the Macintosh, allows you to view your documents in either portrait or landscape orientation, whichever is better suited for your current applicatioon.



The Nikon LS-3500 Film Scanner, which has the highest resolution of any 35mm scanner available, has been chosen "best in the category" by Macworld readers, and will therefore garner for Nikon a Macworld "World Class Award."

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In-Depth

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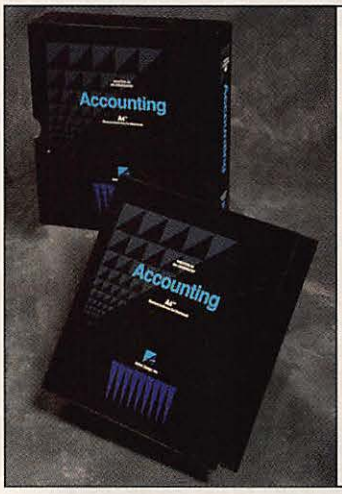


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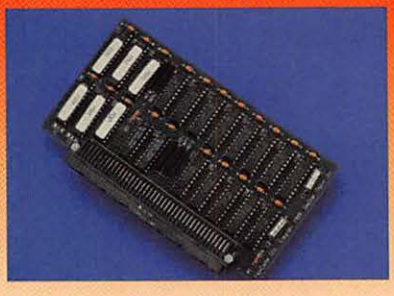
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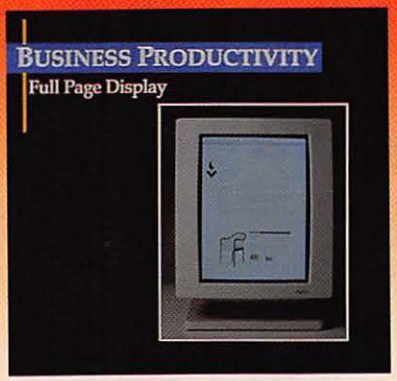
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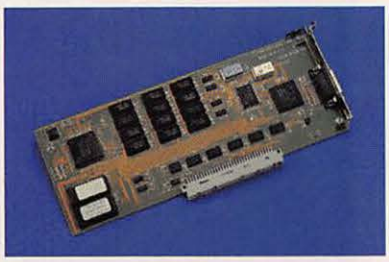
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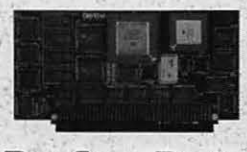
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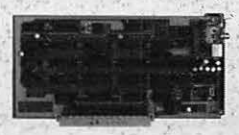


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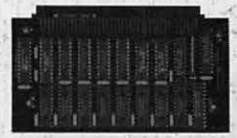
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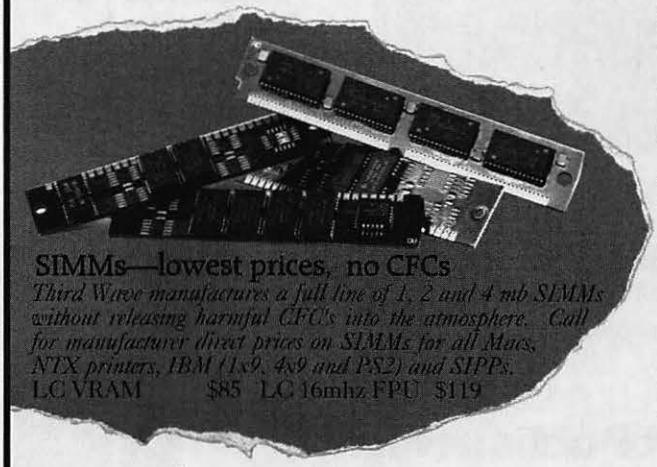
64K Cache Card $159

Improve your Mac IIci NuBus performance.



The most affordable Datadrive™ on the market, at only $1495.

Third Wave's DATadrive™ with Retrospect—backup an entire network on a single DAT cartridge. Now available with 2 gigabytes of storage.



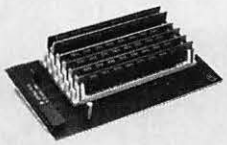
SIMMs—lowest prices, no CFCs

Third Wave manufactures a full line of 1, 2 and 4 mb SIMMs without releasing harmful CFCs into the atmosphere. Call for manufacturer direct prices on SIMMs for all Macs, NTX printers, IBM (1x9, 4x9 and PS2) and SIPPs.

LC VRAM $85 LC 16mhz FPU $119

SIMMpack for the Classic





SIMMpack, the new Classic upgrade board from Logica makes use of your old 256k SIMMs in 1mb Classics. Save at least $50 and as much as $250 on every Classic by allowing the re-use of 256K SIMMs. Available in four configurations:

SIMMpack	
Board only (0 mb)	$45
(0 mb) with drive bracket*	63
(0 mb) w/40mb Maxtor	315
(0 mb) w/80mb Maxtor	445

*Remove SIMMs & drive from IIsi, install in Classic.

Media

Teac CT600H (60mb)	$17
Teac CT600N (150mb)	24
SyQuest SQ400	70
4mm DAT Tape, 60 meter (certified computer grade)	19
Optical Cart (ISO) 512/1024	149



Combo Drives

105/45R	$1020
170/150t	1410
170/DAT	2400
210/DAT	2500
425/45R	2040
425/DAT	3340



UltraCombos and DAT Combos are excellent choices for network servers or for use in graphic, pre-press and CAD applications, where storage and workable hard drive space is imperative.

Mindsurfing for the Mac

Ride the (Third) Wave. This attractive 100% white cotton shirt is silkscreened in three colors (red, aqua and black). Large or Extra Large. $12.



Third Wave Computing (800) 284-0486

1826B Kramer Lane, Austin, Texas 78758 (512) 832-8282 • (512) 832-1533 (FAX)

Graphic Design ©Three A. D. Inc., 1991. Photography ©Jack Puryear Photography, 1990/91, ©John D. Mitchell of Infocus Photography, 1991. This ad was produced using a Macintosh IIcx and SE30, with Third Wave removable drives, Quantum 105 internal drives, a Nikon LS slide scanner and a Microtek 300ZS color scanner. It was output on a Compugraphic 9600. Software used includes Adobe Illustrator, Photoshop and PageMaker. The product names are trademarks of their respective companies.

Most deliveries via Federal Express.

Third Wave (800) 284-0486



XAPSHOT. The quickest way to bring 24- bit images to your Mac.

Take a look at the new XAPSHOT still video camera from Canon. XAPSHOT allows you to import high quality still video images to your MAC using a frame grabber. It stores up to 50 images on 2" diskettes and can be connected to your TV for previewing. Great for video, slide graphics and print work.

XAPSHOT—$429 **XAPSHOT Bundle with 24-bit frame grabber—$749** **2" video diskette—$10**



See our complete line of video boards and monitors for every budget.

Radius Products	
Radius Rocket	$2549
Direct Color/GX NTSC	590
Radius Color Pivot	1490
Color Pivot Interface	590
Radius 19" 24 bit Color System	**4750**
Radius Accelerators	Call
RasterOps Products	
24STV	1295
24S-24Si-264 SE30	559/769/649
8L-24L Systems	Call
SuperMac Video Systems	Call
Seiko Trinitron 14"	589
Seiko ColorPoint Printers	Call
Ikegami Trinitron 19"	2100
64K IIci Cache Card	**159**
DayStar Powercards	Call
TI MicroLaser PS35	1695
Microtek 600ZS Color Scanner	1599
Nikon LS3500 Slide Scanner	9365
Ethernet Cards	Call

Macworld finds our drives quietest.



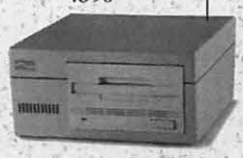
"The quietest of the 64 drives tested...fast—three of the twelve fastest tested were Third Wave's"...and finally, "a good bargain."
-Macworld, *March 1991.*

The 45R uses SyQuest cartridges, available as single, combo or dual removables.

SyQuest, Tape, DAT, Optical

45R SyQuest, one cart	$475
45DR SyQuest, two carts	990
150t Teac Tape Backup	595
DATadrive™ 1.3GB DAT Backup	**1495**
DATadrive™ 2.0GB DAT Backup	1650
OptiDisk™ 600 Sony Optical Drive	3250
OptiDisk™ 1000 Tahiti Optical Drive	4390

OptiDisk™ 600 —the least expensive way to store your data.
Over 30 combination drives are also available from Third Wave. Call for more information.



Internal & External Disk Drives

		Internal	External
40L*	(Maxtor)	$270	$360
52L*	(Quantum)	280	370
80L*	(Maxtor)	380	470
105L*	(Quantum)	440	530
120	(Quantum)	640	730
170	(Quantum)	690	780
210	(Quantum)	750	840
425	(Quantum)	1810	1900

**Low power internal drives that meet Classic, IIsi and LC power specifications.*

Seagate MacWren Drives

	Internal	External
300	$1250	$1400
330 Runner	1450	1600
330*	1640	1760
425	1550	1670
415*	1790	1910
600	1590	1740
650	1740	1890
1000	2550	2700
1350	3490	3640



**Highest capacity internal drives for Mac cx, ci, SE and SE30. These also work in the II and IIfx.*

Third Wave Computing **Circle 156 on reader service card** (800) 284-0486

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- CARRY CASE CI, CX,SI, IMGWTR 82
- CARRY CASE SE/PLUS EXTEND KBD 82
- DUST COVER FOR CLASSIC, PLUS OR SE15 15

ARTICULATE SYSTEMS
- VOICE LINK 152
- VOICE NAVIGATOR II 569

ATTO
- CACHE CARD FOR MAC IICI 189



CUTTING EDGE
52 MB QUANTUM LPS $459
105 MB QUANTUM LPS $691
Cutting Edge Hard Drives feature enhanced chassis design which include: dual fuse circuitry, dual AC power outlets and dual 50 pin cable connectors, confirms our commitment to value without compromise.

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- MAC TILT MAC SE/PLUS 59

FARALLON
- MACRECORDER 2.0 164

I-PROTECT
- FILTER ANTI RADIATION - SE/PLUS 69
- FILTER ANTI RADIATION FULL PG. 81
- FILTER ANTI RADIATION14" MONITOR 75
- RADIATION FILTER FOR 19" MONITOR 119

ICD
- GRAFLEX 83

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- MACII STAND & CABLES 67
- TURBO MOUSE ADB 109

KEYTRONICS
- MACPRO PLUS 129

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- MOUSEMAN 79

MOUSE SYSTEMS
- LITTLE MOUSE ADB 79

VENTANA PRESS
- SYSTEM 7 BOOK 19

Communications

ABATON
- INTERFAX 24/96 325

HAYES
- SMARTMODEM 2400 & SMARTCOM 399
- V-SERIES ULTRA 9600 MODEM 782

PROMETHEUS
- 24/96MSR FAX MODEM 265
- 9600/9600M PLUS V.32/42 MNP5 665
- 9600M-EC V.32/42 MNP 5 665
- PROMODEM 2400 MINI MODEM 115
- ULTIMA14,400 BAUD MODEM 685

SHARP
- EBR-9600 BAUD MODEM W/MNP5 279

SHIVA
- ETHERGATE 1449
- ETHERPORT 299
- FASTPATH 1899



SHARP

9624e External Modem $279
Extended Baud Rate (EBR-9600™) and MNP5 Error Correction. Powerful, yet economical performance. The value-priced Sharp 9624e external modem can drastically cut transmission time and cost. The Extended Baud Rate feature allows either modem to send and receive data accurately at speeds up to 9600bps. Compatible with all modems.

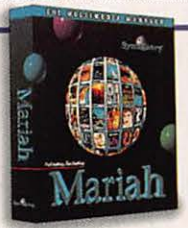


DEST PERSONAL SCAN $669
"Recognize! 2.01- New version now includes image capture." One-of-a-kind! Breakthrough combination of full-page hand-held and 10 page sheet feed scanner in one unit. Includes hand-held scanner, auto sheet feeder, Recognize! omnifont OCR software and cables.

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CUTTING EDGE
- 105 MB EXTERNAL QUANTUM 691
- 45 MB REMOVEABLE DRIVE 599
- 52 MB EXTERNAL QUANTUM 479

IDS
- PRO 105 MB QUANTUM 529
- PRO 200 MB CONNER 969
- WIP 120 CONNER 608
- WIP 40 CONNER 355
- WIP 50 QUANTUM 399



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Symmetry's new Mariah™ is the first mixed-media organizer that lets you manage graphic images, sound clips, animations and text files in the same portfolio. Supports multiple catalogues open, color palettes, large screens, networks and over 14 different image formats. A way to archive megabytes of mixed data at your fingertips.

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- 3-PACK CARTRIDGES (44 MEGS) 265

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- DATAPAK 88 REMOVEABLE HD 1250

PLI
- 45 CARTRIDGE 79
- INFINITY 40 SINGLE W/CARTRIDGE 689
- INFINITY OPTICAL 3431

Monitors & Boards

CUTTING EDGE
- DUAL PAGE PG. MONITOR SYSTEM 895
- FULL PAGE SYSTEM FOR LC 541
- FULL PAGE SYSTEM FOR PLUS 541
- FULL PAGE SYSTEM FOR SE 541

E MACHINES
- QUICKVIEW STUDIO 1839
- QUICKVIEW Z21 1839
- T16 COLOR PAGE SYSTEM 1999
- T19 19"" COLOR SYSTEM 3699
- TX 16"" COLOR SYSTEM 2688

GENERATION SYSTEMS
- CLASSIC MONO15" DISPLAY SYS 695
- CLASSIC MONO19" DISPLAY SYS 1051

IKEGAM
- CT20 19" 24 BIT SYSTEM 3495

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- 16" COLOR 2008 HI-RES SYSTEM FOR MACII 2588
- RIVAL 2001 SYSTEM FOR MAC II, SE, SE30" 1085

NEC
- MACSYNC HC COLOR MONITOR 489

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- 24SI ACCELERATED BOARD 647D

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- LASERSCRIPT LX PRINTER 1599

KODAK
- DICONIX PRINTER 399

NEC
- COLORMATE PS MODEL 40 4999
- SILENT WRITER 2 MODEL 90 1795

QMS
- COLORSCRIPT 100 7795
- QMS PS 810 LASER PRINTER 2999

Printers/Scanners

ABATON
- SCAN 300 COLOR 1699
- SCAN 300/GS 1289



COLORSTUDIO $599
ColorStudio by LetraSet is True Color imaging software. ColorStudio can help you create color illustrations; scan and input existing prints, slides and drawings...retouch color photos... assemble montages and composite images all on your Macintosh!

ANIMAS
- TRUE COLOR HAND SCANNER 562

CAERE
- TYPIST 469

DEST
- PERSONAL SCAN & RECOGNIZE 669

LOGITECH
- SCANMAN SCANNER 299

MARSTEK
- MARS 800-MAC 64 HAND SCANNER 399

MICROTEK
- SCANMAKER 1850S SLIDESCANNER 2449
- SCANMAKER 600GS GREYSCALE 1118
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- UMAX COLOR 300 1675



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Infini-D is an integrated 3D modeling, rendering and animation environment. Infini-D supports photo-realistic shading and ray-tracing, infinite lights and cameras and complete object metamorphosis. Imports DXF and Swivel3D™, includes over 250 surfaces.

Business

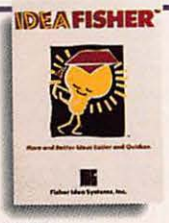
ASHTON TATE
- FULL IMPACT 135
- FULL WRITE PROFESSIONAL 135

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- DATABASE 1.5 70

CAERE
- OMNIPAGE 499

CERES SOFTWARE
- INSPIRATION 3.0 115

CLARIS
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IDEAFISHER $422
7 Megabytes of Smartware. The most powerful brainstorming system invented. For writers, creatives, designers, planners, producers, and other thinkers. Because the highest paid people in any business are those who come up with the best ideas.

- FILEMAKER PRO 209
- MACWRITE II 139

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- DELTA GRAPH 1.5 117

DEST
- RECOGNIZE 475

FISHER
- IDEA FISHER 422

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INNOVATIVE DATA DESIGN
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MANPRO
- GENERAL LEDGER PRO 799

MECA
- MANAGING YOUR MONEY 128

MICROSOFT
- EXCEL 3.0 299
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- MICROSOFT WORD 4.0 248

ODESTA



MULTI-AD SEARCH $108
Multi-Ad Search™ is an image cataloging and retrieval system. Users can search by keyword, filename, filetype,volume or expiration date. Thumbnails or text display. Supports EPSF, TIFF, PICT, and MacPaint files.

- DATADESK 465
- DOUBLE HELIX 365

PARAGON
- NISUS 238

PEACHTREE
- AT ONCE 299
- INSIGHT EXPERT each module 535

REALITY
- WEALTH BUILDER 98

SOFTWARE DISCOVERIES
- RECORD HOLDER PLUS 78

SYMMETRY
- KEY PLAN 255

TIMESLIPS



THE TYPIST.....$469
The Personal Scanner™. Designed as a compact peripheral for either Macintosh or PC compatibles, Typist can input 500 words per minute directly into any application. It also features true 300 dpi resolution to achieve high quality optical character recognition.

- TIMESLIPS III 2.0 189
- TIMESLIPS TAL MODULE 55

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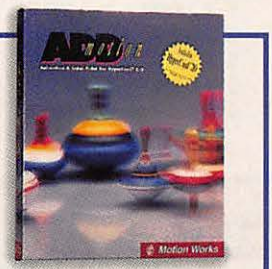
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CLARIS
- MACDRAW II 275

DELTAPOINT
- TASTE 1.01 89

DYNAWARE
- DYNAPERSPECTIVE 2.0 599

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ADDMOTION.....$177
Motion Works...The first animation and color paint program to be fully integrated within HyperCard 2.0. Add animation, color and sound to any HyperCard stack quickly and easily. Includes intuitive interface, pathbased animation, and built-in color paint with 24-bit color support.

- MEDIA TRACKS 189

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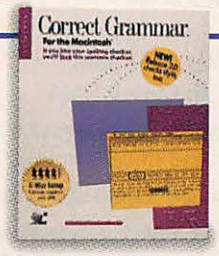
SPECULAR INTERNATIONAL
- INFINITY-D 3D RENDERER 749

STORM
- PICTUREPRESS 119

SUPERMAC SOFTWARE
- PIXEL PAINT PROFESSIONAL 484

SYMMETRY
- MARIAH 89

T-MAKER



CORRECT GRAMMAR.....$49
Correct Grammar for the Macintosh identifies errors in grammar, style, usage, punctuation--even spelling with its 135,000 word dictionary. You can customize Correct Grammar to respect your personal writing style or compare the readability of your writing by sentence, to the education level of your intended audience.

- WRITE NOW 2.2 115

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- PRESENTER PRO WITH MACRENDERMAN 3299

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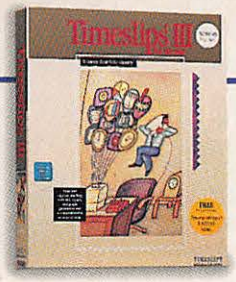
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- QUICKMAIL10 USER 2.2 309

COMPATIBLE SYSTEMS
- ETHER II 299
- ETHER ROUTE 1045

FARALLON
- STAR CONTROLLER 300 889



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Type on Call is the most automatic, affordable way to select any Adobe® typeface you need. Just call to un-lock any typeface with instant access. With this purchase you will recieve Adobe Type Manager(ATM) along with 13 typefaces plus 2 Adobe Font packages from our top selling list.



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Timeslips III is a a complete time keeping and billing package for people whose stock and trade is their time. You gather time data with the TS Time DA. When the time comes to send the bill, TS Report will extract of formats. Timeslips III can handle 250 users, 250 different activities per user, and over 3,000 clients, with up to 128 projects per client.

- STAR CONTROLLER ETHERNET 1699
- TIMBUKTU 4.0 133
- TIMBUKTU REMOTE 2.0 133

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- STUFF IT DELUXE 2.0 62

ASD
- FILEGUARD 2.5 137

AVERY
- MACLABEL PRO 47

BASELINE PUBLISHING
- EXPOSURE PRO 75
- PERSONALITY 58

CE SOFTWARE
- DISKTOP 4.0 64



SMARTCOM II®.....$82
The easiest Mac communications software to use--automates communications with Autopilots, provides error-free file transfer options, holds information for later use in its peruse buffer, stores frequently used instructions and supports single session X.25 communications.

- QUICKEYS 2 94

ICOM SIMULATIONS
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- ON CUE 34
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IMAGEN
- ULTRA SCRIPT PLUS 285

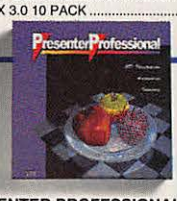
INSIGHT DEVELOPMENT
- MACPRINT 89

INTERNATIONAL BUSINESS
- DATA CLUB 10 PACK KIT 499
- DATA CLUB 3 PACK KIT 175

LANGUAGE SYSTEMS
- FORTRAN WITH MPW 398
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- EMPOWER 1 SECURITY 119
- EMPOWER 2 SECURITY 142

MICROCOM
- VIREX 3.0 59
- VIREX 3.0 10 PACK 345



PRESENTER PROFESSIONAL™ WITH MACRENDERMAN™ $3299
Release Version Now Available! Presenter Professional with MacRenderMan gives you the fastest and most intuitive way to illustrate and present your ideas in 3D. Includes freeform 3D Bezier illustration, Photorealistic rendering, Path/Object animation, and Raytracing.

MICROLYTICS
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- MULTI-AD SEARCH 108

ON LOCATION
- ON LOCATION 78

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- DISK DOUBLER 42



MULTI-AD CREATOR.....$429
Power, speed, precision and color-separating abilities make Multi-Ad Creator™ the top-rated DTP program. Multi-Ad Creator is the high-end choice for making ads—or any page—fast. "If you create ads, get it."—MacUser

SERIUS
- SERIUS DEVELOPER 324
- SERIUS PROGRAMMER 194

SOFTWARE COMPATABILITY
- SOFTWARE BRIDGE 75

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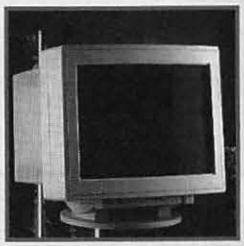
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MacTel Color Solutions

When purchasing Systems, compare the options and features. VisionPRO Color Graphic cards are manufactured under license for MacTel Technology and support Macintosh graphical needs now and in the future.

VisionPRO Monitor Systems



- **8-Bit 20"Business System**
  8-Bit Video ES Interface w/ Pan-Zoom (2x, 4x) & Virtual Desktop, and 20" Trinitron **75 Hz** with Tilt/Swivel stand.
  - All software and cables included ..... $ **2695**
- **24-Bit 20"Business System**
  24-Bit Video ES Interface w/ Pan-Zoom (2x, 4x) & Virtual Desktop, and 20" Trinitron **75 Hz** with Tilt/Swivel stand
  - All software and cables included ..... $ **3055**
- **8-Bit 19" Sony SystemPRO** **Call**
- **24-Bit 19" Sony SystemPRO** **Call**
  VideoPRO Interface w/ Pan-Zoom (2x, 4x) & Virtual Desktop, supports block mode transfer, acceleration and 19" Sony Trinitron **75 Hz** (GDM-1950) with Tilt/Swivel stand.
  - All software and cables included

**All VisionPRO Interface cards have multi-monitor support (Sony 19" & Ikegami 20"), support BlockMode transfer & acceleration, Upgradeable 8-Bit to 24-Bit cards, Pan/Zoom 2X & 4X and virtual desktop.*
Business system video card offers Pan/Zoom 2X & 4X and virtual desktop.

➪ **24-Bit VisionPRO Interface Upgrade Kit** *w/ purchase of any system PRO* ..... $ **600**

Monitors

Apple 13" RGB ..... $ 749
Hitachi 14" MVX Super ..... $ 575

Video Interface/cards

- **8-Bit Vision ST 813** for 13" or 14" Monitor ..... $ 275
- **24-Bit Vision ST 2413** for 13" or 14" Monitor ..... $ 375

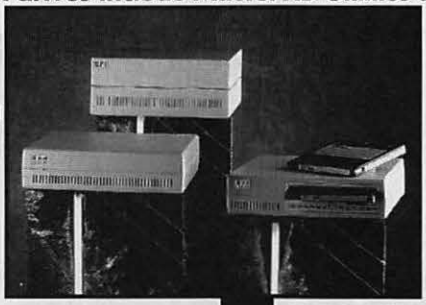
Quantum Drives Index 3.5"

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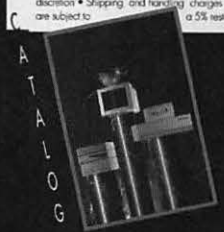
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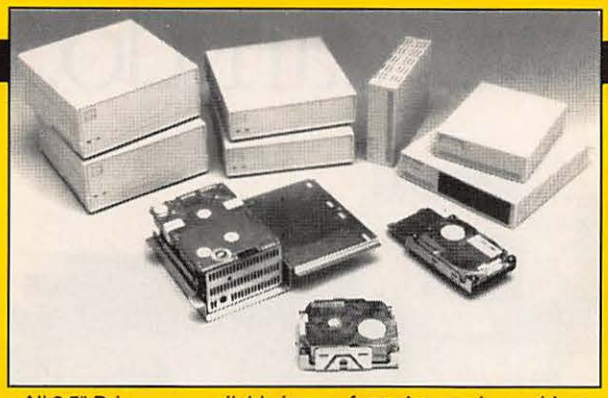
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404MBH/H.....	$1578	$1678
600MB F/H	$1624	$1724
630MB RUNNER II..	$2038	$2138
1.2 Gig.....	$2398	$2498

Quantum Drives

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105MB 3.5"LPS.....	$448	$498
120MB 3.5"	$598	$658
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The SyQuest drive with the NuBus compression board -2 to 10X more storage from your drives **$599**



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Pinnacle REO 130 Optical	$2629	$81
PLI Infinity Turbo 88	$1299	$41
MIcronet 88 MB Removable	$1149	$36
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Quantum mechanisms. 2 year warranty.		
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80 MB	$395	$12
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105 MB low profile	$459	$14
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600 MB Seagate	$1899	$60
600 MB Wren Runner	$2199	$69
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Removable Drives		
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SyQuest Cartridge	$67	$2
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600 MB Sony ISO	$3199	$96
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MagicTape 525 MB	$999	$30
MagicTape 1.3 gig DAT	$1695	$51
MagicTape 2.6 gig DAT	$1895	$57
MagicTape 2.4 gig 8mm	$2895	$87
MagicTape 5.0 gig 8mm	$4499	$135
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NEC CDR 36 Portable	$485	$15
NEC CDR 73	$699	$21

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Magic 9600 baud V.32, V.32 Turbo, V.42, V.42bis MNP-5 modem **$429**

Abaton 24/96 FaxModem	$295	$9
DoveFax 24/96	$289	$9
DoveFax 24/96 Plus	$353	$11
Prometheus Ultima 96	$699	$21
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Magic 2400/4800 Baud SendFax	$89	$3
Magic 2400/9600 Baud SendFax	$99	$6
Magic 2400/9600 Send/Receive Fax	$179	$6
Magic V.32 & V.42 Bis MNP-5 Modems		
2400 V.42 bis MNP-5 Modem	$175	$5
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MagicNet (localtalk)	$19	$1
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DayStar 50 MHz 030 IIx	$1829	$55
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Magic RailGun 030 25 MHz	$699	$21
Magic RailGun 030 33 MHz	$999	$30
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CalComp ColorMaster+ PS	$5519	$166
Dayna EtherPrint	$359	$11
HP LaserJet IIIP	$1179	$35
JetFill HP DeskWriter Refill	$11	$1
Kodak Diconix M150	$389	$12
NEC SilentWriter Model 90	$1749	$53
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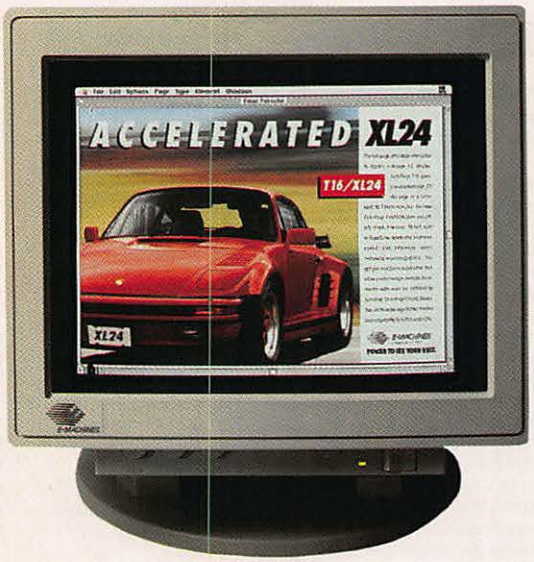
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MacUser LABS, May 1991

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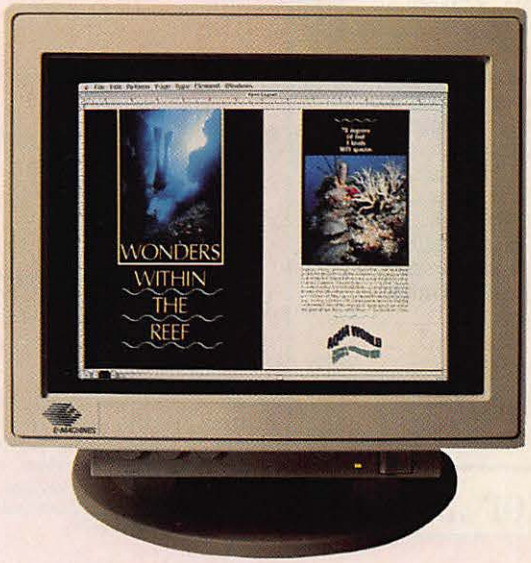
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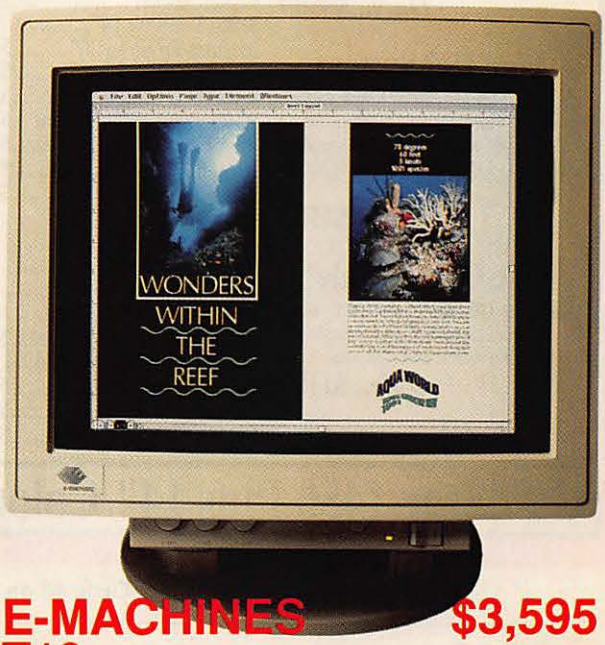
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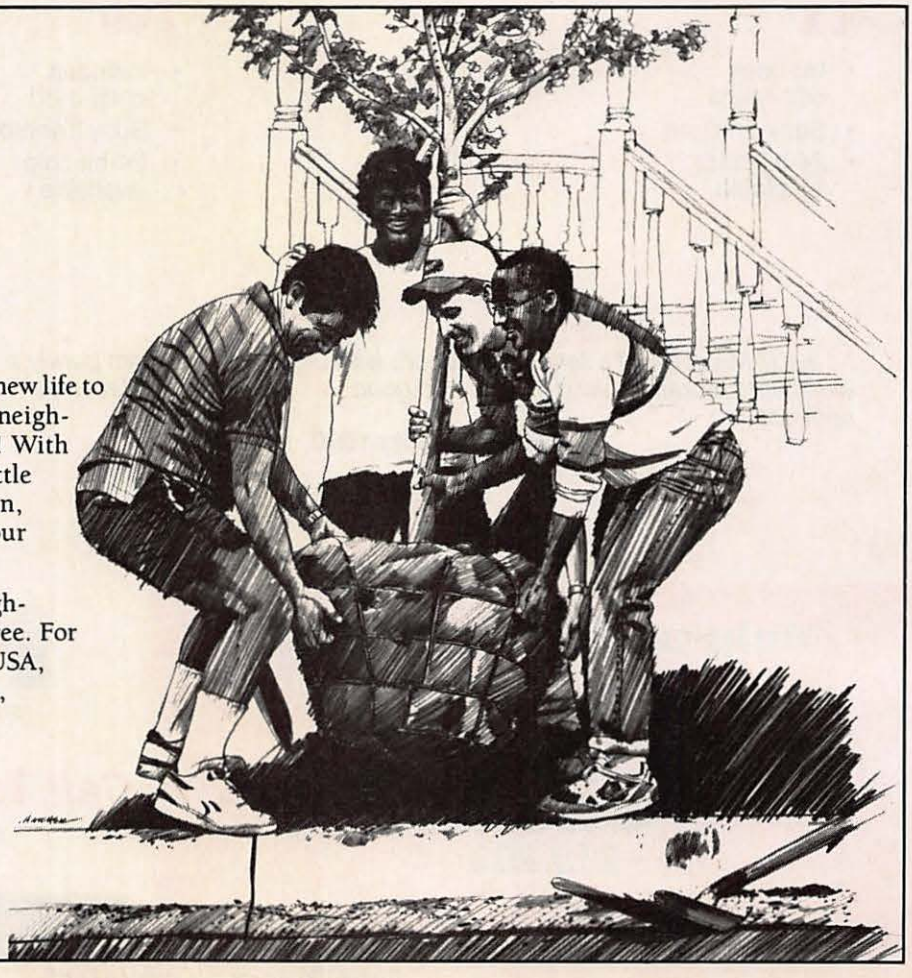
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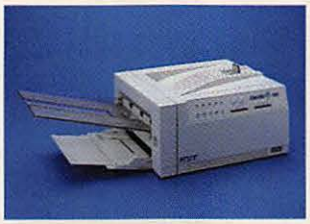
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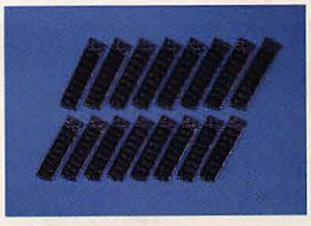
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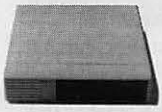
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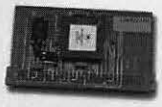


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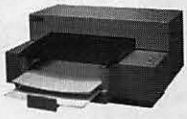
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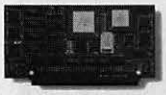
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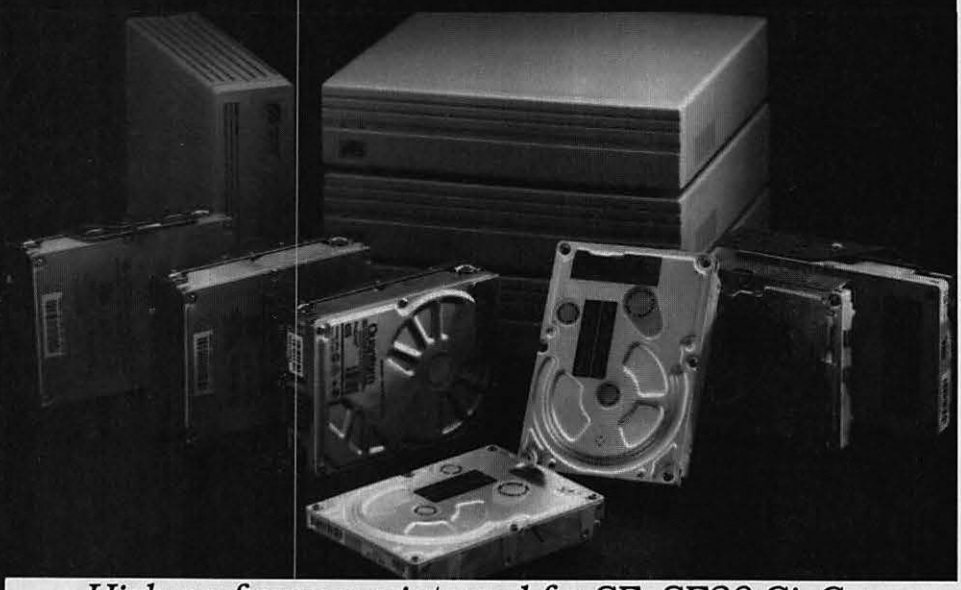
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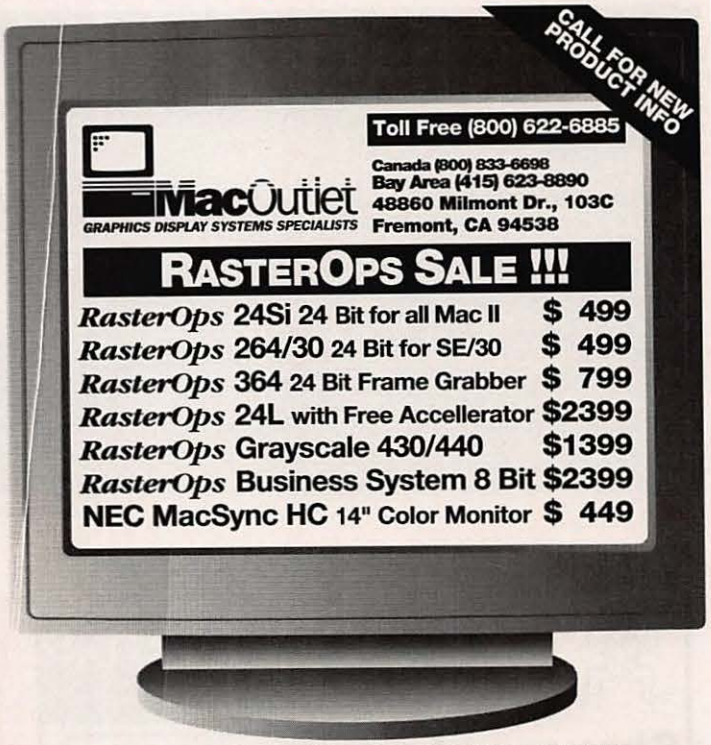
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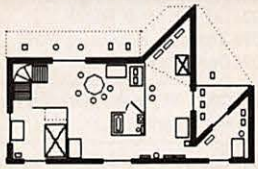
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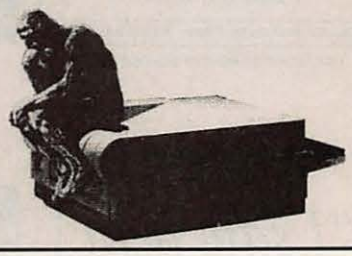
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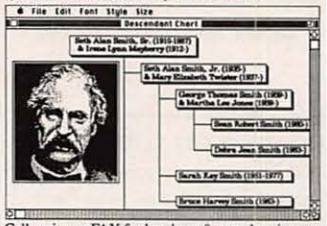
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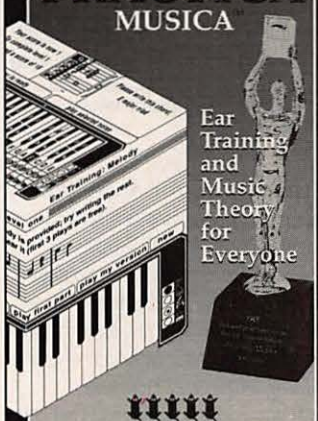
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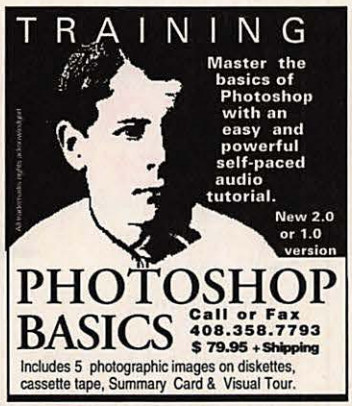
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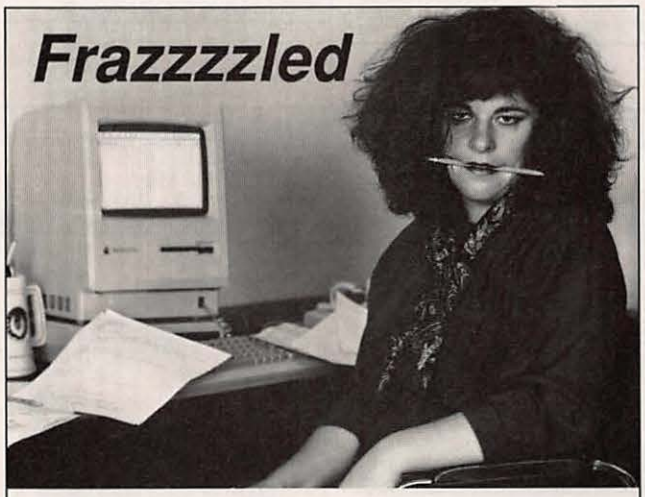
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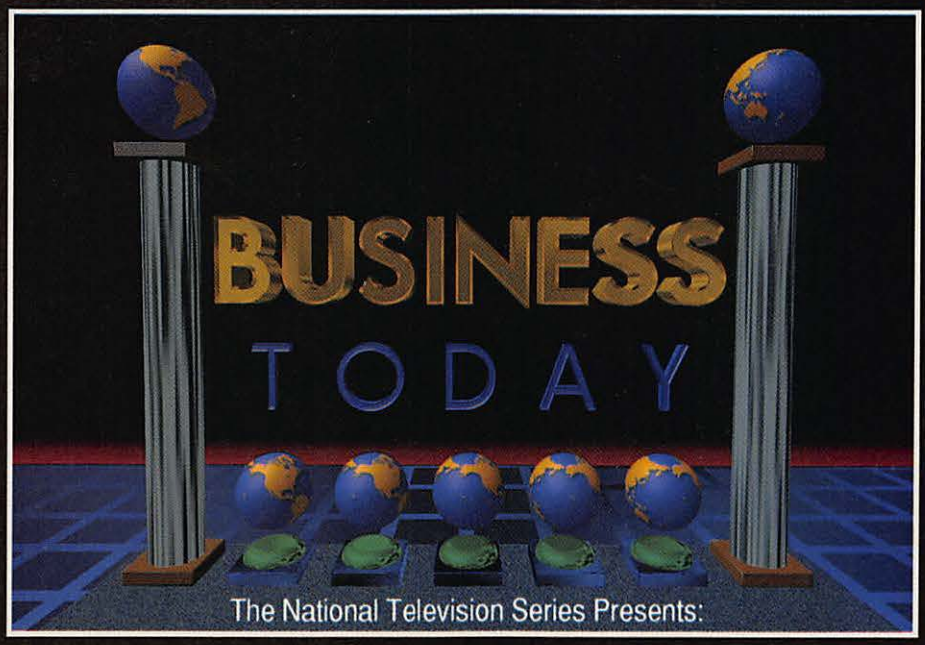
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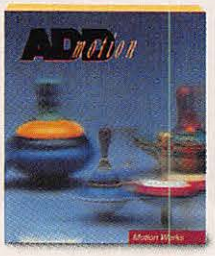
"Computer Business Today." For people who use computers. Tuesday evenings, Friday and Sunday mornings. Check your local listings for time and channel information.

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TO PUT A NEW TWIST ON HYPERCARD, JUST ADD MOTION.

Introducing ADDmotion,™ the interactive animation program that will change the way you create multimedia presentations. ADDmotion tops off HyperCard® 2.0 with powerful modules that can be used to create stunning animated sequences. The software enables you to edit and create full color pictures, animate them, and add four-track sound. All within HyperCard 2.0! ADDmotion is so simple to use,



even people who have never used HyperCard can quickly and easily create colorful presentations for the boardroom, classroom, or living room. Imagine it. Sophisticated animation on the Macintosh.® ADDmotion gives the user object-oriented and interactive animation allowing maximum flexibility and impact. Of course we haven't left out the power user. ADDmotion allows cues to be passed back to HyperCard, providing complete interaction with the HyperTalk™ programming language. With our unique licensing agreement anything you create using ADDmotion can be distributed royalty free! To put a new twist in HyperCard visit your local dealer, and ask about ADDmotion, or call us at **(604) 732-0289** for more information.

Motion Works

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CPU's and More...

Custom configurations are just one of our many specialties. Whether it's something as simple as a Mac IIsi with aNuBus adapter card already installed, or you need a Mac IIfx with 32 Mb of RAM and a 1.05 Gig internal, just call us. We build them everyday!

Macintosh Classic	$875.00
Macintosh Classic 2/40	$1275.00
Macintosh Classic 2/52	$1399.00
Macintosh LC 2/40	$1799.00
Macintosh LC 4/105 w/ 512K VRAM	$2299.00
Macintosh IIsi 3/40	$2575.00
Macintosh IIsi 5/105	$3189.00
Macintosh IIci 5/0	$3499.00
Macintosh IIci 5/105	$3975.00
Macintosh IIfx 4/0	$4879.00
Macintosh IIfx 8/210	$5869.00
Macintosh SE/30 2/40	$2299.00
Macintosh IIsi NuBus Adapter Card	$199.00
Macintosh IIsi 030 Direct Slot Card	$199.00
Apple IIe Card for Macintosh LC	$149.00
Apple Extended Keyboard	$160.00
Apple Standard Keyboard	$90.00

Systems and More...

All of our packages are complete. There are not any hidden extras to buy.

Mac LC Student Package — $2659
4 Mb of RAM, 40 Mb internal hard disk, Mouse, Microphone, Keyboard, Apple 12" RGB monitor and StyleWriter printer.

Mac IIsi Office Package — $4799
5 Mb of RAM, 105 Mb internal hard disk, 40 Mb ETC External SCSI hard disk, mouse, microphone, Apple standard keyboard, Apple 13" RGB monitor, and Personal LaserWriter LS.

Mac IIci Designer Package — $7599
8 Mb of RAM, 170 Mb internal hard disk, Mouse, Apple extended keyboard, Radius Color Pivot and Apple Personal LaserWriter NT.

Printers and More...

If you need it in print, the collection of printers we have to offer can't be beat in perfomance or price! Because printers can be accessed on a network or via direct connection, most manufacturers don't supply cables. We'll help you get it hooked-up right.

QuickDraw	
Apple ImageWriter II	$429.00
Apple Personal LaserWriter SC	$1374.00
HP DeskWriter w/AppleTalk Interface	$525.00
GCC PLP II & IIS	Call
TrueType	
Apple StyleWriter	$439.00
Apple Personal LaserWriter LS	$929.00
PostScript	
Apple Personal LaserWriter NT	$1799.00
Apple LaserWriter II NT	$2729.00
Apple LaserWriter II NTX	$3399.00
Epson EPL-7500 with RISC processor	$2249.00
GCC BLP II & IIS	Call
TI MicroLaser PS17 w/AppleTalk	$1299.00
TI MicroLaser PS35 w/AppleTalk	$1680.00
NEC SilentWriter 2 Model 90	$1649.00
QMS PS-410	$1995.00

Internal Drives and More...

Quantum drives are one of the best on the market. They are fast and reliable. The LPS drives are only one-inch high and can be used in the Macintosh Classic, LC and IIsi. The PRO drives are half-heights. All ETC internal drives come with brackets, cables and DataWare™ formatting software.

ETC 52 Mb Quantum LPS, 17msec	$275.00
ETC 105 Mb Quantum LPS, 11 msec	$449.00
ETC 105 Mb Quantum PRO, 19 msec	$399.00
ETC 170 Mb Quantum PRO, 11 msec	$899.00
ETC 210 Mb Quantum PRO, 11 msec	$769.00

External Drives and More...

ETC's external drives come in a zero-footprint half-height cases with a Universal power supply, power outlets, push button SCSI addresses, cables, and DataWare formatting software.

ETC 52 Mb Quantum LPS, 17msec	$379.00
ETC 105 Mb Quantum LPS, 11 msec	$539.00
ETC 105 Mb Quantum PRO, 19 msec	$469.00
ETC 170 Mb Quantum PRO, 11 msec	$809.00
ETC 210 Mb Quantum PRO, 11 msec	$869.00

Big Hard Drives and More...

If you need lots of on-line storage, ETC's line with the Seagate/Imprimis WREN drives are the best value on the market. With a 5¼-inch form factor, the ETC Internal drives can be use in the Mac II, IIcx, and IIfx.

Internal	
ETC 307 Mb WREN-4, 16.5 msec	$1199.00
ETC 337 Mb WREN-Runner-1, 10.7 ms	$1449.00
ETC 613 Mb WREN-5, 16.5 msec	$1559.00
ETC 676 Mb WREN-6, 15.5 msec	$1799.00
ETC 676 Mb WREN-Runner-2, 11.9 ms	$2099.00
ETC 1.05 Gig WREN-7, 15msec	$2499.00
External	
ETC 307 Mb WREN-4, 16.5 msec	$1299.00
ETC 337 Mb WREN-Runner-1, 10.7 ms	$1499.00
ETC 613 Mb WREN-5, 16.5 msec	$1699.00
ETC 676 Mb WREN-6, 15.5 msec	$1899.00
ETC 676 Mb WREN-Runner-2, 11.9 ms	$2199.00
ETC 1.05 Gig WREN-7, 15msec	$2599.00

Removables, DAT and More...

If you and your data are always on the move, don't shut-down or backup without one of these. All of the systems below come with appropriate software, SCSI cable and one cartridge.

ETC 45R Syquest Removable	$455.00
ETC 88R Syquest Removable	NEW
ETC 1.2 Gb DAT Tape Backup	$1499.00
ETC 2.0 Gb DAT Tape Backup	$1619.00
45 Mb Syquest Removable Cartridge	$64.00
88 Mb Syquest Removable Cartridge	Call
60M DAT Tape for ETC DAT 1.2	$23.00
90M DAT Tape for ETC DAT 2.0	$43.00

Networks and More...

If you need networking solutions today, we can provide you with everything from BNC connectors, cables, and terminators to LocalTalk routers, EtherNet interface cards and Repeaters. Call us and we'll help you build you network at a price you can afford.

Phone network adapters	$19.00
AppleShare File Server Software 2.0	$410.00
NEW! Asanté MacCon+ 30iE/Radius	Call
Asanté MacCon+ LC E&T	$249.00
Cabletron MR5000C Repeater	$2389.00
EtherNet Thick and Thin	
Macintosh II EtherTalk NB Card	$499.00
Asanté MacCon+ IIE or 30iE	$249.00
Asanté MacCon+ IIE64 or 30iE64	$289.00
EtherNet Thick and 10BaseT	
Asanté MacCon+ IIET or 30iET	$249.00
Asanté MacCon+ IIET64 w/ 64 K RAM	$289.00
Asanté MacCon+ 30iET64 w/64 K RAM	$289.00

Video and More...

We have a complete collection of Apple and Apple compatible video products. Call us with your video requirements, and we will help you choose a video system that is right for you and your system.

Apple 12" Monochrome Monitor	$229.00
Apple 12" RGB Monitor	$429.00
Apple 13" RGB Monitor	$669.00
Apple 15" Portrait Monitor	$769.00
Apple Two Page Monitor	$1199.00
Sanyo 14" Trinitron RGB	$619.00
Macintosh Display Card 4•8	$439.00
Macintosh Display Card 8•24	$545.00
Macintosh Display Card 8•24 GC	$1349.00
512K VRAM Upgrade for Mac LC	$99.00

High-end Video and More...

If you need to see more than 640•480, here are some of the most innovative video solutions around.

RasterOps	
Mac II Systems	
RasterOps 8L Hitachi System	$2299.00
RasterOps 8L Trinitron System	$2999.00
RasterOps 24L Hitachi System	$4579.00
RasterOps 24L Trinitron System	$5269.00
CorrectColor Calibrator	$1929.00
ClearVue GS 19" Gray Scale System	$1414.00
ClearVue II 19" Monochrome System	$1160.00
Mac LC and Classic Systems	
RasterOps 8LC 19" Hitachi System	$3314.00
ClearVue LC 19" Monochrome System	$1160.00
ClearVue Classic 19" Mono System	$1160.00
Mac Display Boards	
RasterOps 24si Display Board	$579.00
RasterOps 24S Display Board	$389.00
RasterOps 364/SE30 Display Board	$579.00
RasterOps 8L Display Board	$1279.00
RasterOps 8LC Display Board	$579.00
ClearVue GSLC Display Board	$579.00
Multimedia Boards	
NEW! RasterOps 24XLTV Board	$3199.00
RasterOps 24STV Board	$1199.00
24STV Accelleration Board	$198.00
RasterOps Video Extender NTSC	$475.00
Radius	
Pivot Displays	
Color Pivot Display IIs and IIci	$1369.00
Color Pivot 8-bit System	$1899.00
for SE/30, LC, II, IIx	
68882 Math Coprocessor for LC & IIsi	$134.00
Pivot Display for IIsi and IIci	$779.00
Pivot 8-bit System	$975.00
for SE/30, LC, II, IIx	
Full Page Displays (two in stock!)	
Full Page Display for Classic	$899.00
Full Page Display for LC	$909.00
Direct Color Systems	
DirectColor/8 with Color Display/19	$4085.00
DirectColor/8 with Color Display/21	$4215.00
DirectColor/24 with Color Display/19	$5135.00
DirectColor/24 with Color Display/21	$5265.00

Open 7 Days a Week

Monday thru Friday	Saturday and Sunday
9:00–9:00 EDT	10:00–6:00 EDT

Terms and Conditions:
Payment: MAs for MORE accepts Visa, MasterCard, CODs, and Purchase Orders. CODs are accepted Bank Certified Check up to $2500. Corporate and School Purchase Orders are Net-15 for orders over $1000 only, and are subject to credit approval. Ask for details when ordering. Warranties: Warranties apply to systems sold through Mac and MORE, Returns: All orders returned for any reason will be charged a minimum 15% restocking fee. Call for an RMA before returning. Returns must be in original packaging with all software seals unbroken. Shipping: For orders over $1000, we will ship to destinations in the continental US at no charge. Some large items may not be included in this offer. Not responsible for typos. Terms, Conditions, and Prices are subject to change without notice.
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800-MAC-0052

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Best Sellers and More...

If you don't see something that you need–call. Chances are we have it in stock!

Apple 7.0 Personal Upgrade Kit	$99.00
Abaton InterFax 24/96	$349.00
Adobe Type Manager 2.0	$59.00
Adobe Illustrator 3.0	$379.00
Adobe Photoshop	$599.00
Aldus PageMaker 4.0	$499.00
Aldus Freehand 3.0	$399.00
Claris MacDraw II	$289.00
includes FREE MacPaint, Clip Art Library, and upgrade to MacDraw Pro!	
Claris MacWrite II	$139.00
Claris FileMaker Pro	$215.00
Claris HyperCard 2.0 Development Kit	$145.00
DoveFax Desktop Modem	$299.00
Kensington Turbo Mouse ADB	$119.00
Microsoft Word 4.0	$245.00
Microsoft Excel 3.0	$309.00
Prometheus ProModem 9600MPlus	$599.00
Quark Xpress 3.0	$519.00

MacAcademy's video tapes help shorten the learning curve. There is even a tape for System 7.0. Call for a complete listing.

Pagemaker Beginning to Advanced	$43.00 ea
Excel Beginning to Advanced	$43.00 ea
Adobe Illustrator 3.0 Beginning to Adv.	$43.00 ea
System 7.0	$62.00

Scanners and More...

Scanners helped revolutionize the way graphics and text get to the desktop. Here are some of the best.

Caere Typist Hand Held OCR	$479.00
Logitech ScanMan-32 Hand Scanner	$319.00
Microtek MSF-300ZS Color Scanner	$1699.00
Sharp JX-300 BCS	$2195.00
Sharp JX-450 PCS	$4595.00

Extended Warranty Service for your Macintosh

CLUB 24

As the fastest-growing direct reseller of Macintosh systems, peripherals and software, Mac and More can now double the warranty on your Mac system with membership in Club 24. Services include:

- 24 month warranty on Apple products
- Shipping via FedEx included both ways
- 72 hour repair or replace turn around

Want more details?
Call 1-800-MAC-0052 now!

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BEST-SELLERS

BUSINESS SOFTWARE

Months on chart	Last month	This month		
75	1	1	**Microsoft Word**	Microsoft Corporation
66	3	2	**Microsoft Excel**	Microsoft Corporation
54	2	3	**Microsoft Works**	Microsoft Corporation
62	4	4	**Aldus PageMaker**	Aldus Corporation
27	5	5	**FileMaker Pro**	Claris Corporation
28	7	6	**QuarkXPress**	Quark
27	8	7	**WordPerfect**	WordPerfect Corporation
51	6	8	**MacWrite II**	Claris Corporation
14	9	9	**Quicken**	Intuit
54	—	10	**MacDraw II**	Adobe Systems

EDUCATION SOFTWARE

29	3	1	**Where in the World Is Carmen Sandiego?**	Brøderbund Software
10	1	2	**Where in Time Is Carmen Sandiego?**	Brøderbund Software
42	2	3	**Reader Rabbit**	The Learning Company
16	4	4	**Where in the USA Is Carmen Sandiego?**	Brøderbund Software
55	5	5	**Math Blaster**	Davidson & Associates

ENTERTAINMENT SOFTWARE

20	1	1	**SimCity**	Maxis
18	2	2	**Tetris**	Spectrum HoloByte
5	3	3	**SimEarth**	Maxis
12	5	4	**Welltris**	Spectrum HoloByte
13	—	5	**Crystal Quest**	Casady & Greene

NETWORK/DATA COMMUNICATIONS

54	1	1	**TOPS**	Sitka Corporation
49	2	2	**AppleShare**	Apple Computer
12	5	3	**MicroPhone II**	Software Ventures
11	3	4	**Timbuktu**	Farallon Computing
8	4	5	**White Knight**	FreeSoft

MASS STORAGE*

Months on chart	Last month	This month		
18	1	1	**MacStack SD40**	CMS Enhancements
6	2	2	**UltraDrive 45**	GCC Technologies
2	5	3	**Infinity 40 Turbo (Removable)**	PLI
1	—	4	**Micro/Stack 105**	MicroNet Technology
4	—	5	**MacStack SD45**	CMS Enhancements

ADD-IN BOARDS

9	1	1	**Macintosh Display Card 8•24**	Apple Computer
4	3	2	**Macintosh IIsi NuBus Adapter Card**	Apple Computer
10	2	3	**Pivot**	Radius
11	4	4	**Radius TPD Interface**	Radius
1	—	5	**MacCon+ 30i Ethernet Card**	Asante Technologies

UTILITY SOFTWARE

16	1	1	**SAM II**	Symantec Corporation
10	2	2	**The Norton Utilities for the Macintosh**	Symantec Corporation
16	3	3	**SUM II**	Symantec Corporation
3	4	4	**After Dark**	Berkeley Systems
14	—	5	**Adobe Type Manager**	Adobe Systems

PRODUCT WATCH

Recent or forthcoming products of particular interest.

Multiple Master Fonts *Adobe Systems*
Characters with modifiable attributes

Lotus 1-2-3 for the Mac *Lotus Development Corporation*
Spreadsheet now adapted to the Mac with a user-friendly interface

Gravis MouseStick *Aristotle Industries*
Joystick with three buttons

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during April 1991.

*Does not include hard drives installed at the factory.

There Are Very Few Things As Reliable...



pherals From Mirror.

Mirror also has a flock of big screen color monitors at prices that will seem like chicken feed.

Mirror color display systems include a free copy of Olduvai's critically acclaimed VideoPaint software, which has a suggested price of $495. And all Mirror monitors come with a full one year warranty and many extras such as pop-up menus and screen saver software.

You've got to get up pretty early in the morning to find a better value or a more reliable company than Mirror. And if for some reason, your Mirror peripheral doesn't live up to your expectations, we'll give you 30 days to get your money back.

So before you buy a Macintosh peripheral from a company that may expire before the warranty, give us a call at **1-800-654-5294.**

Our 19" Two-page Display System has an anti-glare screen and concedes nothing to more expensive makes.
$877

MIRROR

Visit us at MacWorld Expo, Bayside Booth #1830



To Order, Call 1-800-654-5294 FEDERAL EXPRESS

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As Affordable Perip

Nobody has been selling Macintosh peripherals direct to the end user longer than Mirror. For six years now, we've been doing it the old fashioned way: offering a reliable product at a fair price, backed up by top-notch after sale support.

And that's something to crow about.

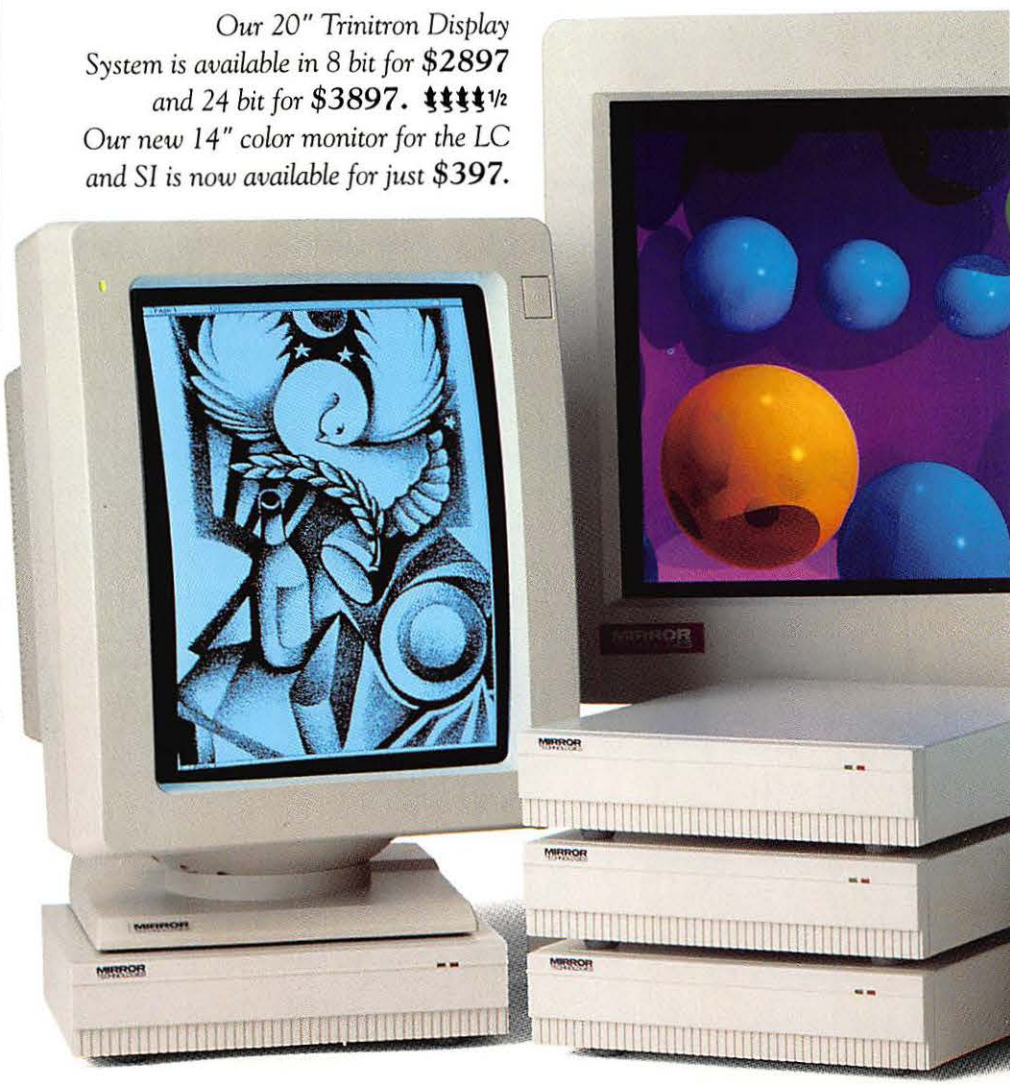
Mirror has a line of quality drives to fit just about everybody's needs and budget. Prices now start as low as $297 for our 40 MB External hard drive as well as $497 for our 45 MB Removable SyQuest drive. Even our large capacity drives, including the 600MB Optical, come with some of the best warranties and prices available.

If you're looking for a big screen monitor, you can save hundreds of dollars by buying direct from Mirror. Our monochrome monitors are available for the Plus, Classic, SE, SE/30, LC and all Mac II models.

Hard drives	Ext.	Int.
40Mb	$297	$217
50Mb(Q)*	$397	$337
80Mb	$397	$337
105Mb(Q)	$497	$437
210Mb(Q)	$897	$847
333Mb	$1297	$1197
425Mb	$1497	$1397
595Mb	$1797	N/A
1 Gb	$2597	N/A
600Mb Opt.**	$2997	N/A
CD ROM	$697	N/A
45Mb Rem.**	$497	N/A
88Mb Rem.**	Call	

*(Q) Denotes Quantum Drive
** Price includes 1 cartridge

Our 20" Trinitron Display System is available in 8 bit for **$2897** *and 24 bit for* **$3897.** ★★★★½
Our new 14" color monitor for the LC and SI is now available for just **$397.**



Our flicker-free 15" Portrait Display allows you to view a full page of text or graphics for **$477.**



Keyboard Shelf and SideClip with Macintosh SE/30.



Keyboard Slideaway with Macintosh IIci.

SPACE THAT WORKS

You're tripping over your keyboard. Your CPU needs its own desk. Your monitor is too low. That report you're working on has vanished. Paper is everywhere.

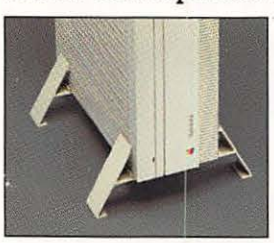
But don't give up.

What you need is some help from Kensington.

Increase valuable desk space with our new Keyboard Shelf for the compact Mac, or with Keyboard Slideaway® for the Mac II.

Both do more than just get your keyboard out of the way.

Keyboard Shelf's recessed storage compartment is ideal for holding pens, disks and other desk items. And Keyboard Slideaway extends a narrow desktop into a wider workspace.



Another way to increase your workspace is our sturdy Mac II stand. The perfect addition for anyone who wants to get their CPU off their desk and onto the floor.

For the compact Mac, there's Maccessories® Tilt/Swivel. With it, you can rotate your Mac up to 100° and tilt up to 16° for just the right viewing position. And unlike other tilt/swivels, we've combined heavy duty plastic and high density polyethylene for an ultrasmooth movement.



What's more, Kensington's products fit right in with the design of your Mac. The styling is complementary. The colors identical. Even the same materials are used.

Kensington.

Because you can't work efficiently if your space doesn't work.

For a free brochure and the dealer nearest you, call 800-535-4242 OR 415-572-2700.

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